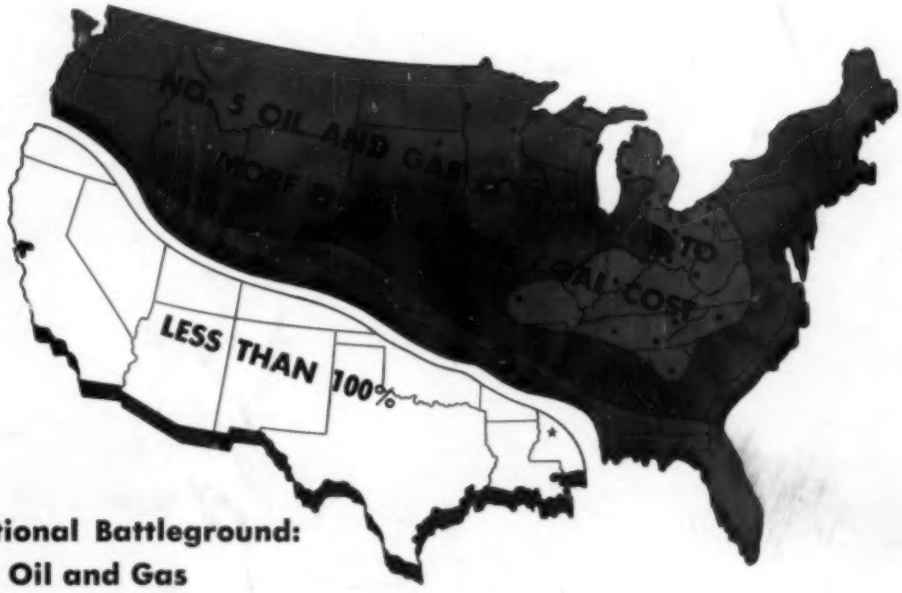
Coal Age

JANUARY, 1957

A McGRAW-HILL PUBLICATION PRICE 50 CENTS

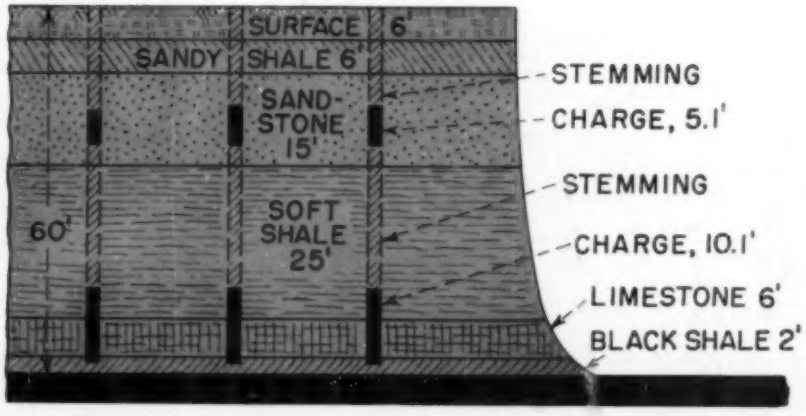
This Month in Coal

with its verbal snapshots of trends and events, reinforces the new Coal Age tell-all contents section starting in this issue. It digests major articles, operating ideas, equipment and news for a quick picture of the issue, and of industry progress . . . pp 5, 7, 11



The National Battleground: Coal vs. Oil and Gas

Coal Attacks Competition p 54



Overburden Preparation Today p 74

Here's why the Edison R-4 Double Filament Bulb saves Productive Man-hours— promotes greater underground safety

With the Edison R-4 double filament bulb, a burned-out filament doesn't mean lost time for the miner or a short crew for the foreman. A turn of the switch transfers the power of the unfailing Edison battery to the second filament—restores continued, brilliant illumination. There is only one bulb, located in the center of the headpiece, which gives the advantage of maximum reflector area.

This reserve protection saves hundreds of man-hours every year, adds an extra margin of safety. Write for full details.

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B.F.Goodrich

Belt shovels 1100 tons of coal an hour

IT takes hundreds of tons of coal an hour to feed the boilers in this Ohio Valley power plant. But it's a long, steep climb from the storage pile up to the bunkers, so an unusually strong conveyor belt was needed.

B. F. Goodrich engineers recommended a belt made with B. F. Goodrich Nyfil fabrics. In this belt, nylon is used as cross threads in the fabric to give extra strength without adding weight. Use of nylon increases flexibility, so belt troughs perfectly whether empty, lightly or fully loaded. Belts made with Nyfil fabrics hold fasteners better, have greater impact resistance, can carry heavier loads farther, higher, than belts made with all-cotton fabrics, yet these longer-lasting belts cost no more.

As a safety measure, B. F. Goodrich built this belt with a new fire-resisting rubber which will not support combustion or spread fire. B. F. Goodrich belts, made with this rubber, have been accepted for listing as fire resistant by the Bureau of Mines. This special rubber also has high resistance to impact, abrasion, oil, grease, tearing, gouging and even mildew attack. So belts made with it can be expected to equal or surpass the long service records made by other B. F. Goodrich coal-handling belts.

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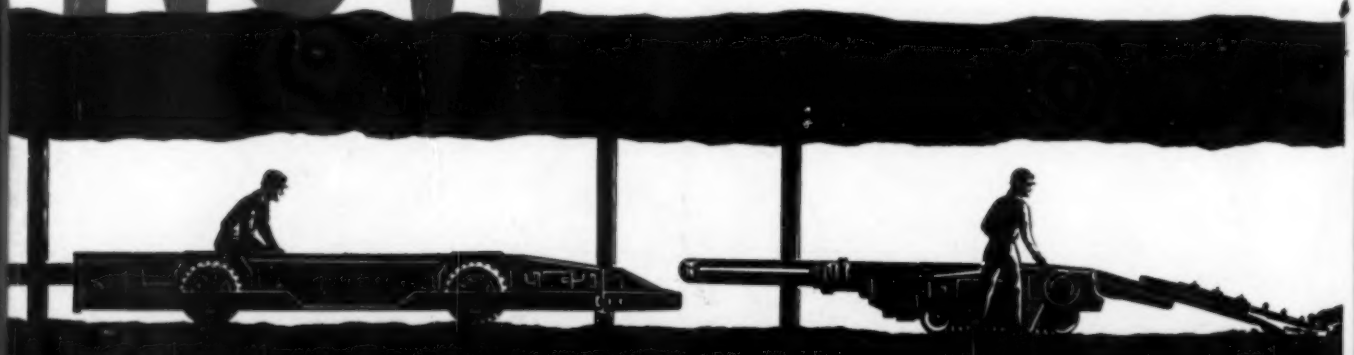
...the most famous grease in the



Hulburt 8 AP Grease—

check these
Hulburt Firsts:

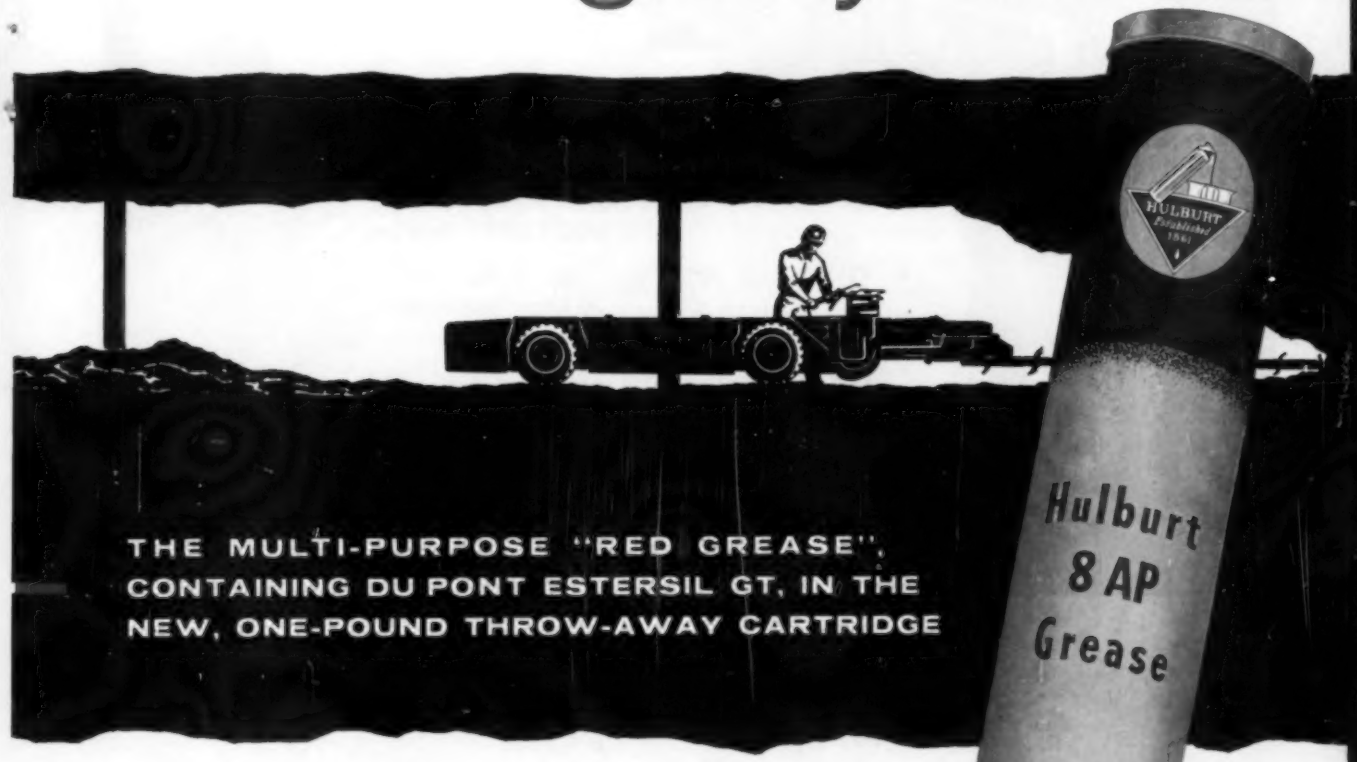
NO WASTE—The new Hulburt cartridge completely eliminates waste associated with refilling from a drum!

NO DIRT—Absolutely no dirt or other corrosive particles can mix with the sealed grease in the cartridge—before, during or after loading!

SAVES TIME—By keeping the easily carried Hulburt 10-pak carton at his side, he loads his gun in seconds and does not lose time returning to the drum supply!

Here, at last, is the fast, clean and thrifty way to keep your equipment in top operating condition. The new Hulburt throw-away cartridge not only saves you money by cutting handling time, waste and damage due to dirt, it also contains the best known and most widely acclaimed grease in the coal mining industry—

coal mining industry **right by his side!**



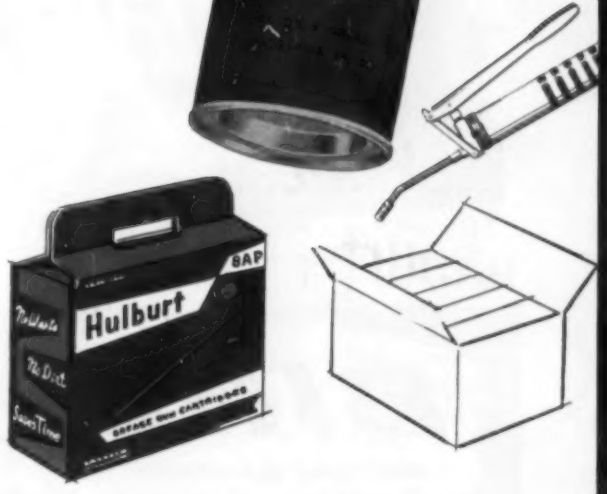
THE MULTI-PURPOSE "RED GREASE", CONTAINING DU PONT ESTERSIL GT, IN THE NEW, ONE-POUND THROW-AWAY CARTRIDGE

HULBURT RED GREASE!

This general-purpose grease has NO MELTING POINT; is COMPLETELY WATER RESISTANT and contains Du Pont's new miracle agent Estersil GT to give it practically unlimited durability.

Call your Hulburt representative today to get your greasing done the modern way.

The new Hulburt Grease Cartridges are available by the case, each containing FIVE handy carrying cartons with 10 one-pound cartridges per carton. *(Total: 50 cartridges per case.)*



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LOOK WHAT YOU'RE MISSING
WITHOUT BIRD COAL FILTERS TO DRY YOUR FINE COAL

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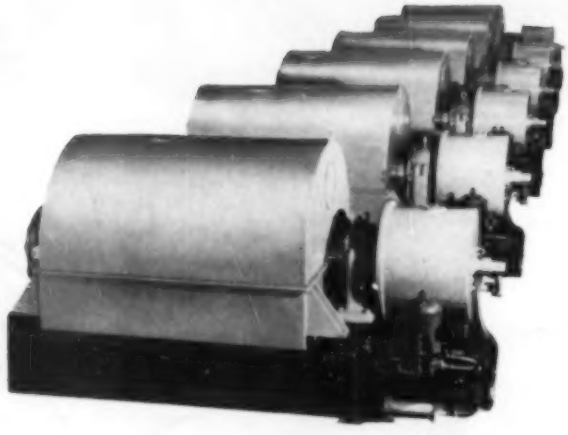

Bird Coal Filters are being used to dry millions of tons of fine coal at the *lowest cost per ton.*

Why miss out on this *proved* way to improve output and economy in your preparation plant.

Let us give you the facts and figures on Bird Coal Filters, whether you wash 100 tons or less per hour — or 2,000 tons or more.

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This Month in Coal Age

JANUARY 1957

► Modern Merchandising

Coal Mobilizes For Total Selling ....p 54

Producers across the board are now convinced that their great progress in production must be matched by similar gains in collective merchandising effort if they are to win the rich promise of coal's future. Their conviction has materialized in the formation of Bituminous Coal Institute. Top item on BCI's agenda is the off-track and on-track market—a large, undefined group which already rivals the utility market in volume and potential for growth. Aims are:

(1) to uproot the entrenchment of competitive fuels in the off-track and on-track market and (2) to overcome traditional trouble spots in the industry's merchandising efforts. Although BCI's program is already underway and expansion in its activities are planned, its ultimate success will hinge on complete cooperation from all segments of the industry including allied groups such as equipment manufacturers and railroads.

Special Features: Examples of how coal is beating competitor; fuel cost comparisons in 79 cities; men behind BCI.

► Face Haulage

Evolution and Revolution in Face Transportation 62

How equipment in service today—cars and conveyors—meets the test of capacity and continuous availability.

Mine cars, if big enough and supplemented by quick-change track layouts, result in high machine tonnages. Shuttle cars provide greater flexibility but service is again intermittent, though this was not too important with high-capacity loaders. With low-capacity miners, however, intermittency became critical, forcing resort to such measures as surge cars and pickup loaders.

Conveyors basically provide continuous service, but extension and moving were problems, especially with the belt. Behind loading machines, jockeying for position offset advantages until the bridge conveyor provided a continuous connection. Quick extension plus the bridge unit also resulted in the extensible belt, now a coming face unit.

Along the Way—A quick history of the development of mine transportation.

► Income Taxes

What's New in Taxation? .....p 67

Ernest O. Wood, CPA, Pittsburgh, Pa.

Roundup of the latest court and IRS rulings covers:

Percentage depletion as it applies to company stores and other nonproductive activities, mine waste, aggregation of properties, stripper's "economic interest," and capital-gain sales.

Accelerated depreciation as it affects salvage values, leaseholds and mine improvements, and equipment wear.

Deductions for vacation-pay accruals, stock option payments and profit-sharing.

► Chemicals From Coal

New Markets From Coal Research ..p 70

Joseph Pursglove Jr., Vice President, Research & Development, Pittsburgh Consolidation Coal Co.

After almost 10 yr and an outlay of $14 million, Pitt Consol has concluded that the char process offers the best near-term possibilities for coal from chemicals. Cresap, W. Va., will be the site of the first char plant in conjunction with the new Kammer power station being built to supply new aluminum plants. With the help of the coal pipeline for transportation, Cresap lays

(*Continued on p 7*)

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MINING MAN'S GUIDE to Ryerson Products and Services

You can draw on your nearby Ryerson plant for an almost endless number of products and services—and the more you concentrate your purchases at one source, the more you save. Ryerson products not pictured here include: Re-bars, expanded metal, grating, plastic pipe, machinery and tools, etc. See your Ryerson catalog for complete list and write for descriptive literature.

BARS—The most complete range of types, shapes and sizes as well as the largest tonnage.

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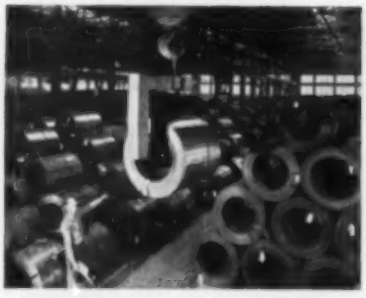
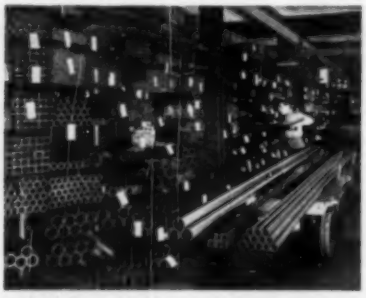
PLATES—14 types including special low carbon plates for forming and welding, leaded New E-Z-Cut, etc.



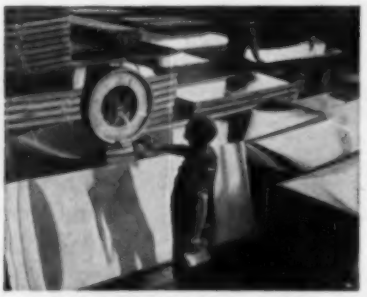
SHEETS & STRIP—More than 20 different types in pattern sizes, cut-to-order sizes, strip coils, etc.



TUBING—Seamless and welded mechanical tubing, fluid power tubing, structural and boiler tubes, etc.

C. F. BARS—Cold finished steel for every use: screw steel, Ledloy, accuracy stock, machinery steel, shafting, etc.

ALLOYS—Every type including leaded alloys for fastest machining, all performance-proved by tests.



STAINLESS—Allegheny stainless in over 2,221 sizes, shapes, types, finishes: sheets, plates, bars, pipe, etc.

FLAME CUTTING—Almost any shape quickly cut from strong rolled steel—one or hundreds all alike.

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the foundation for possible entree into the liquid and gas markets on a major scale.

Highlights: The Cresap plan of joint power and chemical production; types of chemicals and possible markets; where the coal pipeline can fit into coal conversion in the future.

► Overburden Preparation

Better Bank Preparation 74

Drilling equipment and practice generally reflect character and thickness of overburden. New explosives are cheaper and better suited to fragmenting burden for high-capacity operation. Drill choice usually turns on the following:

Sidewall—Thinner cover, not too much hard material, especially at the top.

Vertical—Higher banks with hard layers up from coal.

Combinations—Increasingly popular for greater flexibility and better explosive distribution under varying conditions.

More care in placement and wider use of detonating fuse, MS connectors mark modern explosive practice.

► Oil Treating, Freezeproofing

Guide to Oil Treating .....p 78

John Stewart and **Everett Key,** Ashland Oil & Refining Co., Ashland, Ky.

Oil-spraying applications: dustproofing, preventing windage losses and air pollution, dewatering and preventing moisture reabsorption, freezeproofing, speed of unloading, protection of stockpiles and control of bulk density.

Viscosity at 100 F the principal oil specification. It in turn depends primarily on inherent moisture. Size handling and storage methods and use are others. Uniformity in application essential.

Added Starters—General oil specifications, recommended application temperatures.

► Industrial Engineering

Industrial Engineering Shaves Cost ..p 84

E. E. McBurney, General Manager, Jewell Ridge Coal Co.

Setting performance standards, controlling costs, increasing overall efficiency and creating incentive plans are some of the functions that can be fulfilled by good industrial engineering in coal mining. The coal industry lags other industries in the application of industrial-

(*Continued on p 11*)

This Month in *Coal*

MORE IN '57—Those forecasters willing to stick their necks out are in almost unanimous agreement on the expected rise in bituminous output in 1957. *Coal Age,* its affiliate *Keystone Coal Buyers' Manual,* and the National Coal Association, as an example, are virtually together on the figure set by NCA, which is 532 million tons.

Reason for the increase? The same that brought output up from 470 million in 1955 to around 505 million (final) for 1956—exports, electric power, steel, and general industry, with emphasis on exports and electricity.

Possible trouble spots: not enough freight cars, ocean freighter capacity and ocean freight rates.

WARMER FOR ANTHRACITE—At least one authority says that the winter of 1956-57 will be the coldest in 20 yr, which is warm comfort for anthracite which finished 1956 with a really impressive increase in tonnage and is going into 1957 at an equally fast pace. Everything indicates another good showing by hard coal in 1957.

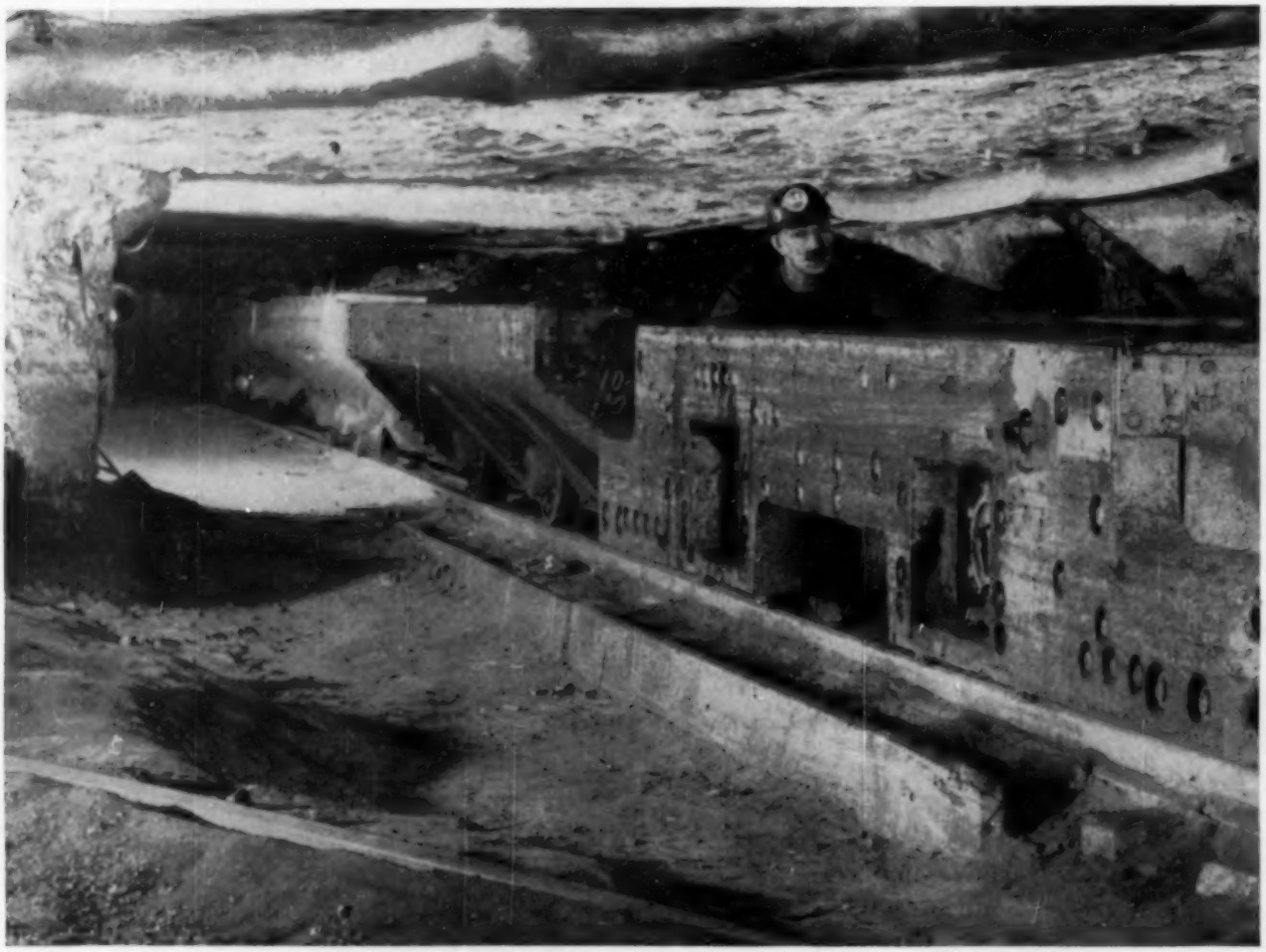
STEEL PINCH?—Steel is stretched all out now and will have to continue at full blast in 1957. This is good news for coal in one way and potentially bad in another. If, for example, priorities are activated to get plate for tankers to supply Europe with oil, there is a good possibility of a chain reaction that might result in priorities for all essential manufacture, including continuous miners (some 300 expected to be sold in 1957), preparation plants and what have you. Probably they wont be imposed, but the possibility cannot be ruled out as of this moment.

MUSICAL CHAIRS, ENGINEER DIV.—A steel shortage is as yet only a possibility. The engineer shortage in coal mining, anthracite excepted, is an actuality, with available evidence indicating that bituminous would employ at least 250 right now if they were available. Equally critical—and the word "critical" is used advisedly—is the shortage of good maintenance men, with the shortage of good mine bosses almost as bad. An acceleration in the movement from company to company therefore is in the cards for 1957—and in the years beyond until recruiting and training programs increase the available supply of such men.

RISING SOUTH—Districts 7 and 8 go into 1957 with a handsome increase in percent of national tonnage behind them as a result of developments in 1956, when they accounted for approximately 38% of the U. S. bituminous output, compared to 31.2% in 1946. Among the reasons is the growth in overseas exports, which are now around one-fifth of the district 8 total, with 23% in prospect in 1957. The reason for feeling optimistic is not far to seek—a further significant rise in European demand as a result of the Suez and Near East troubles. For documentation, see the foreign news section of this issue. One conclusion: the South will continue to rise.

ONE LUBE...
MANY BEARINGS

Simplify *your bearing lubrication by using* ***one*** *lubricant . . .* ***Texaco Multifak . . .*** *for* ***all*** *grease-lubricated, high-speed, anti-friction bearings. You'll reduce lubricant inventory, avoid lubrication errors, save time and money . . . and* ***assure full bearing protection!***



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Texaco Multifak provides effective lubrication for equipment both above and below ground. It pumps easily at low temperatures, has high oxidation resistance, and stands up against wear, water and rust throughout a wide temperature range.

For wire rope and open gears, use *Texaco Crater* or (for convenient spray application) *Texaco Crater X Fluid.* They'll keep your cables strong longer, keep your gears running smoothly, reduce your maintenance costs.

Let a Texaco Lubrication Engineer work out a Texaco Simplified Lubrication Plan for your mine. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

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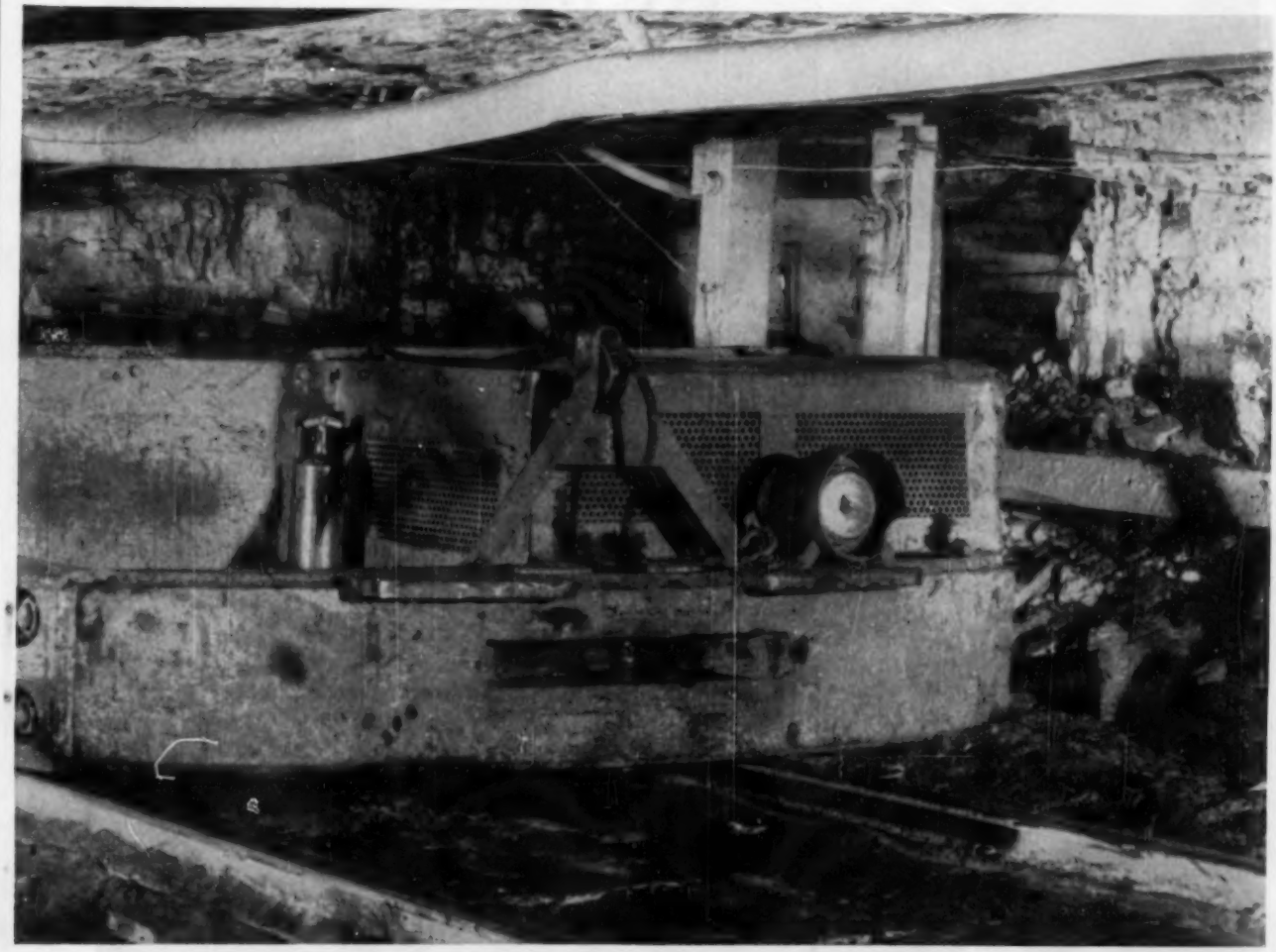
The Texas Company, 135 East 42nd Street, New York 17, N. Y.

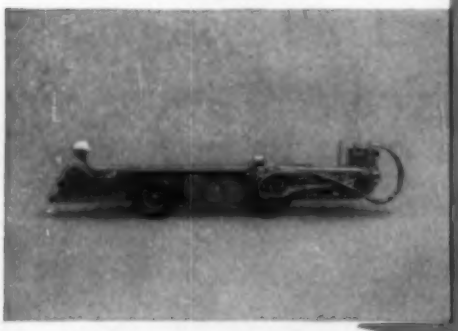


LUBRICANTS for the Coal Mining Industry

FOR STATIONARY AIR COMPRESSOR USERS...

THE ACME JUMBOLTER

Model HSJ



FASTER AND EASIER!

Time studies have proven that under most mine conditions the ACME JUMBOLTER installs roof bolts 3 times faster than hand held machines.

LET THE MACHINE DO IT!

The ACME JUMBOLTER takes the heavy lifting and hauling out of roof bolting. Finger tip control positions the stoper at any desired point. Two stopers will cover any point in a space 23' 10" wide without moving the JUMBOLTER. Arms reach 9' in front of the machine and swing 270°. No blocking is required for uneven top. Ample space provided to carry the day's supplies.

The ACME JUMBOLTER was designed to furnish a quick and easy method of drilling Roof Bolt holes where a mine is equipped with stationary or semi-stationary air compressors and having air piped to the working face. The unit is self propelled with full hydraulic drive and hydraulic steering. It is equipped with two stoper jumbo arms and is complete with stopers and dust collectors. Cleveland Model S11, Model S12 or the popular new Model S20 stopers may be used. All equipment is Bureau Of Mines approved. Best operating conditions in seams 36" to 108" high.

We will demonstrate in YOUR mine. For more detailed information write or call —

ACME Machinery Company

WILLIAMSON, WEST VIRGINIA

This Month in Coal Age

CONTINUED

engineering fundamentals, but recent increases in mechanization make scientific management methods a necessity.

Added Starter: How industrial engineering developed.

► Flame-Resistant Hydraulic Fluids

Researching New Hydraulic Fluids ..p 82

S. P. Polack, Health and Safety Engineer
U. S. Bureau of Mines

Leakage of oil from hydraulic systems of mining machines can be hazardous and expensive. A recent survey indicates that 1 gal of hydraulic fluid is consumed, or lost, for every 25.2 tons of coal mined. Mine fires have been traced to ignition of this leakage. A possible solution to the problem may be found through increased research in the applications and characteristics of straight synthetic fluids, water-base synthetic fluids and water-soluble oil emulsions.

Sidelights: Quantity losses and costs of hydraulic-oil leakage; estimates of future consumption of hydraulic fluid.

The Coal Commentator .....p 12

The first 50 yr for Independent Coal & Coke; planning mining operations and following through; chemicals from coal; how Wheelwright has cut roof-fall accidents; coal's stake in air and water pollution programs.

Editorials .....p 53

"Ahead in '57"—What the new year may bring in trends and developments in mining, preparation and markets.

The Foremen's Forum .....p 86

Principles to follow in selecting supervisors; reducing waste; the hazards of taking equipment into inactive areas.

Operating Ideas .....p 90

Wedge-type bits and holders slash bit costs; semi-automatic method speeds welding; belt spray operates automatically; high-capacity winder speeds belt moves.

Equipment News .....p 94

Trucks and other haulers, front-end loaders, engines and overburden drills feature new products for strip mining; anticorrosion film drying in minutes heads list of materials and products for deep mining, preparation and auxiliary operations.

The News Roundup .....p 120

Foreign Developments—A complete up-to-the-minute roundup on European fuel requirements and problems as a result of the Suez and Near East conflicts.

Coal in the U. S.—Freight-rate developments, export prospects; news briefs from throughout the industry, with personal notes, preparation contracts, equipment approvals and the new department of mining patents among the added starters.

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The Coal Commentator

The A-B-C Story

"Aberdeen," "Blue Blaze" and "Castle Gate" are the "A-B-C" of "The A-B-C Story." They are trade names that have meant quality coal for a long span of years in the West—fifty to be exact, or the first half century in the history of the Independent Coal & Coke Co., operating in the Carbon County coal field of Utah. Fifty years is not too unusual, but then it is not too usual either in coal-mining annals. Thus it well warrants marking, as Independent has done in an anniversary brochure made available to your commentator through the kindness of W. J. O'Connor, president and general manager.

In that 50 years, as Mr. O'Connor points out, "Independent has emerged from a small pick-and-shovel prospecting venture to a great mechanized system of mines that produces 1,000,000 tons a year. Its market has widened from a restricted area that could be served by horse-drawn wagons to a region reached by a network of rails in ten western states." Mr. O'Connor doesn't say, but there have been some rough spots at times. But the difficulties have been surmounted and Independent has demonstrated its right to share in the fruits of progress in the future.

Prime Asset

The activities of our friends in other lands interest your commentator and from time to time provide grist for his mill. One conclusion is that problems are pretty similar all over. Take the case of a new mine being opened by the Electricity Commission of New South Wales, at Dapto, in "The Land Down Under." **The problem? Working two seams, one about 80 ft above the other. The answer? Columnization and synchronization, even as here. The hazard? Failure to follow plan.**

To extend the discussion, failure to follow plan is often as disastrous as bad planning itself. True, slavish adherence to a system in the face of a radical change in conditions is not conducive to the best in results. But if a mining system has been carefully developed to take full advantage of the potentialities of a machine or a group of machines, one of the responsibilities of the men called upon to operate the plan is to stick to it, avoiding impromptu or spur-of-the-moment deviations. **Such self-discipline, buttressed by a willingness to study an operation and propose modifications when they seem to have possibilities, is an asset that will be more and more valuable in coal.**

Gum to Cresap

Gum-chewing, a standard U. S. pastime, is still going strong. So says *Chemical Week*, one of the new and fast-growing stars in the McGraw-Hill galaxy. *CW* notes that sales of chewing gum were expected to reach $165 million in 1956, a 21% jump over 1950. This means to chemical producers 4,000 tons of polyvinyl acetate, more than 2,000 tons of microcrystalline wax, 10,000 tons of natural gums (mostly chicle) and 9,000 tons of flavors. To the coal point, part of this array is derived from coal, though producers can envy the ability to round up $165 million for only 25,000 tons of materials. But perhaps the envy will be less keen in the coal-processing era to be ushered in by the Cresap plant, now being built in Ohio. For the details, and for a sober and realistic analysis of coal-processing prospects, see the article by Joseph Pursglove, Jr., in this issue of *Coal Age*.

Conclusion: Coal can look forward to a lot more in the chemical field than a few tons of flavoring material for chewing gum, et cetera.

Every Time

Some records are fairly easy. Others represent a peak in effort that truly merits the term outstanding. **Such is the accomplishment of the men and officials at the Wheelwright (Ky.) mine of the Inland Steel Co. who, up to the time this was written, were well on their way to a full year of operation without a lost-time roof-fall accident.**

Wheelwright has not been especially favored in natural condition. Its equipment and methods represent no radical departures from those common in the industry. What, then, is the secret of such a record? It is the personal approach. **Where every man, and every official, as at Wheelwright, is determined to have safety, safety will be achieved and the irreducible minimum in accidents will be attained.** The principle is as old as mining. Fully accepted and put into practice, as at Wheelwright, it gets results every time.

No Ease-Off

Whether it be air or water, coal is increasingly on notice, with other industries, on pollution. As has been pointed out in *Coal Age* in recent months, the pressure for action grows and with it the number of enforcement bodies. Thus, the federal government is increasingly in the picture via, among other things, the new Water Pollution Control Act and the appointment Nov. 9 of eight citizens long interested in water problems to the Water Pollution Advisory Board of the Public Health Service.

There need be no expectation of the roof falling in suddenly, but at the same time there is no reason to assume that things will ease off. **The logical course is for coal men to familiarize themselves with pollution problems, whether air or water; support the organizations set up to deal constructively with them; and make sure that the industry itself does not aggravate the situation by failure to impose reasonable controls on its own operations.** It is worth repeating that a little effort now may ward off king-sized headaches and expenses in the future.

MAXIMUM SHOVEL OUTPUT on upper Beauharnois lock construction is maintained by fast, easy-loading International PAYHAULER units. High tensile steel sides, triple section bottom, super-duty "spring cushions" plus strongest frame in "95's" class stand up to repeated pounding of big rock.

11 rock-speeding Payhauler® Trucks

SPARK MONTHLY PRODUCTION OF 220,000 YDS. ROCK AND EARTH!

Eleven International "95" PAYHAULER trucks...because of their high speed, big pay-capacity and around-the-clock endurance...are playing the starring roles in the St. Lawrence Seaway's biggest, and probably toughest, single show!

The 24-ton capacity PAYHAULER units are sparking a demanding monthly production schedule of 120,000 cu yds of rock and 100,000 yds of common earth. The scene is United Waterways Constructor's $14½ million contract of the upper Beauharnois lock construction and channel excavation near Montreal, Quebec.

PAYHAULER units also loaded out most of the rock for fill from cuts made on a lower Beauharnois lock. On a similar shorter-haul rock job in the midwest recently, two identical PAYHAULER units maintained a production average of 2,400 cu yds per day! And here on the seaway, with average 4,000-foot one-way hauls, PAYHAULER units high speed, next-to-automatic Torqmatic brake control, and minute-saving, easy-to-heap big capacity are cutting cycle time to a minimum—and maximum loads as well.

Success on the seaway and on other tough coal-stripping and handling jobs all over the country is proving International PAYHAULER units to be what coal men themselves asked for...a big-capacity, high-speed hauler with low downtime and operating costs. Try one on your job, soon. See your International Construction Equipment Distributor.

TON-SIZED ROCKS go up... then down into fill in 12 seconds. Two-stage hydraulic hoist provides full-time power control. Hydraulic snubbing assures over-center dumping, gentles body return.

INTERNATIONAL®
CONSTRUCTION EQUIPMENT

International Harvester Co., 180 N. Michigan Avenue, Chicago 1, Illinois

A COMPLETE POWER PACKAGE INCLUDING: Crawler, Wheel and Side-Boom Tractors ... Self-Propelled Scrapers and Bottom-Dumps... Crawler and Rubber-Tired Loaders ... Off-Highway Trucks... Diesel and Carbureted Engines... Motor Trucks.

NOW—PRECISION-MADE

Unique Optical Comparator Assures Accurate

As the first to apply the technique of micrometric projection to the manufacture of wire screen cloth, Hewitt-Robins can now meet the most exacting specifications every time. With the use of this Optical Comparator, an unusually high degree of accuracy can be obtained because all measurements and comparisons are made on a greatly enlarged image rather than on the object itself. There is no direct contact with any part nor can there be any deformity caused from measuring pressure.

The actual wire sample is projected on a master chart with such magnification that the operator can instantly see and correct the smallest variation in the specified crimp. As a result, the crimping machine can be adjusted to three decimal places to obtain maximum uniformity of product.

This is one more special Hewitt-Robins technique for assuring you the finest in wire screen cloth for every sizing, separating or screening operation. Hewitt-Robins wire screen cloth is tougher . . . resists extreme abrasion . . . lasts longer. Every piece is tightly woven with precisely accurate openings and will provide you with higher operating efficiency and lowest cost per ton.

Hewitt-Robins screen cloth is obtainable in a wide variety of weaves in plain steel, spring steel, oil-tempered steel, stainless steel and many other alloys . . . is carried in stock in both Super and Gyraloy grades, 3/16" openings and coarser.

INDUSTRIAL DIVISIONS
PRODUCTS

INDUSTRIAL HOSE • VIBRATING CONVEYORS
CONVEYOR BELTING • CONVEYOR MACHINERY
VIBRATING SCREENS • DESIGN, MANUFACTURE,
ENGINEERING AND ERECTION OF
COMPLETE BULK MATERIALS HANDLING SYSTEMS
"JONES" POWER TRANSMISSION EQUIPMENT
"GLIDE RIDE" THE NEW MOVING SIDEWALK

HR HEWITT-

STAMFORD,

SCREEN CLOTH

Quality Control

New Optical Comparator for testing the crimp of wire screen cloth compares samples with master chart. Projected image has been magnified 10 times for precision comparison by D. K. Wallace, Superintendent of Hewitt-Robins Square Mesh Department.

ROBINS

CONNECTICUT

HEWITT-ROBINS VIBRATING SCREENS

Hewitt-Robins Vibrating Screens are manufactured in a variety of styles and a wide range of sizes for every need of industry.

GYREX SCREENS

General-purpose, positive-stroke, 4-bearing screen with amazing versatility of application and an unsurpassed record for stamina in service.

STYLES M AND MS VIBREX SCREENS

Full-floating, unbalanced, pulley-type, 2-bearing screen. Offers sharp sizing of a wide variety of materials at low cost.

STYLE J VIBREX SCREENS

General-purpose screen applicable to a wide variety of screening operations. Wide range of sizes for suspended mounting.

STYLE HS HIGH-SPEED VIBREX

For fine screening operations (up to 100-mesh in some cases). Highly effective circle-throw screening action.

ELIPTEX SCREENS

Exclusive 3-way elliptical motion for sharpest sizing and most effective dewatering. Horizontal-operating flat screens.

HI-G SCREENS

Revolutionary new "modified resonance" principle permits larger screens and bigger capacities at less power. Unusually sharp screening action. Can be made in sizes larger than any other vibrating screen on the market.

FOR SERVICE AND INFORMATION ON BELTING AND HOSE CALL YOUR LOCAL HEWITT-ROBINS INDUSTRIAL SUPPLY DISTRIBUTOR LISTED IN THE "YELLOW PAGES"

Latest Stoper Drill Development Simplifies Roof Bolting in Low Coal

Le Roi-Cleveland S-20 Vac-Nu-Matic stoper, with new feed principle, is only practical machine in seams from 36" down to 26". Other sizes available for any seam height.

28-inch feed S-20 weighs only 65 pounds. It is the lightest dust-collecting type stoper available—operators say it's easier to use.

The revolutionary S-20 stoper is designed especially to provide a better way of producing roof-bolt holes.

Low coal or high coal makes no difference to this machine. It lets you put your roof-bolts wherever you need them — even in 26-inch coal. And high drilling speed along with light weight and a positive dust-collection system helps your miners get the work done faster.

New feed principle provides low overall height and longer travel. The S-20's feed consists of an air piston combined with a chain in such a way that the travel of the machine is double the travel of the feed piston. As a result, it drills a deeper hole with one steel change than a standard stoper does with two changes.

Because it does away with at least one steel change and in some cases two, this longer travel saves roof-bolting time.

The low overall height is obtained because the S-20 is the only stoper that starts its feed at the bottom of the machine. The starting height, regardless of feed length, is always 16½ inches.

Dust collection is instantaneous. There are no hoods or tubes to handle or adjust, when your miners use the S-20 Stoper. The cuttings and dust are pulled through the drill steel instantaneously and ejected through the side of the chuck housing into the dust box—no cuttings go through the machine itself.

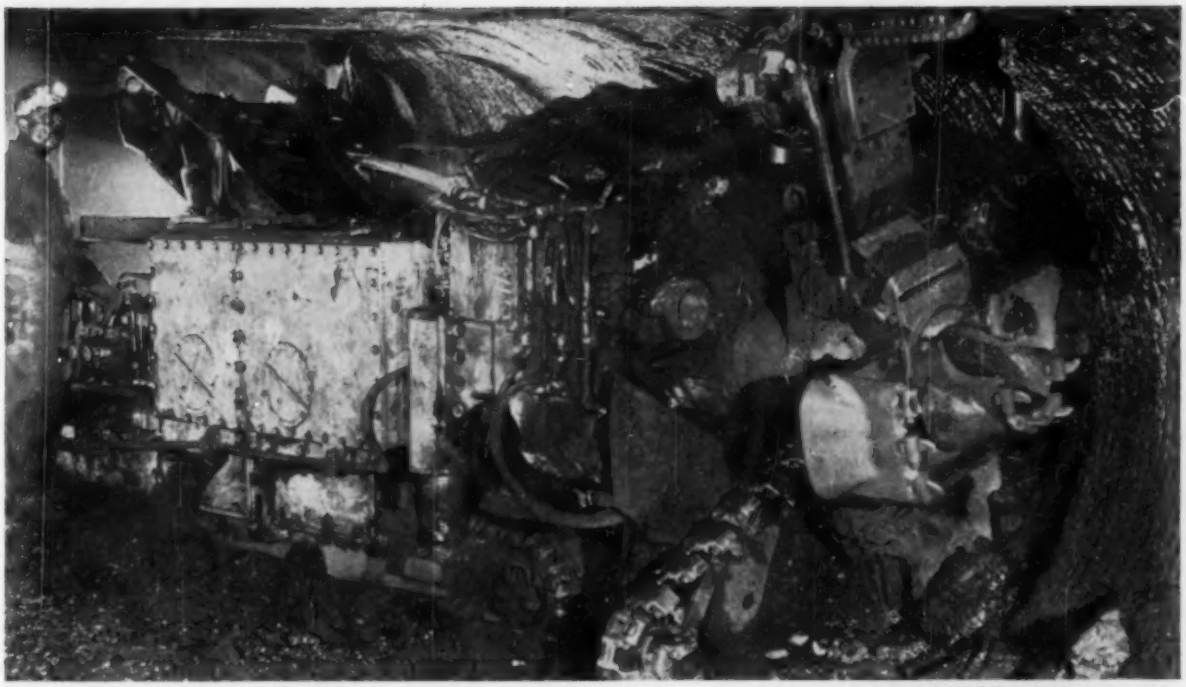
There's complete absence of dust because the S-20 system pulls a high vacuum. It uses only 18 cu. ft. of air at 80 lbs. pressure to pull a static vacuum of 16½ inches of mercury or a fluid vacuum of 13 inches while the machine is running. Wet top presents no problem.

New design speeds roof-bolting operation. The S-20 has been in the field for more than a year, working in all types of coal mines. According to the evidence piled up during this period, S-20 users not only roof-bolt areas heretofore impossible to get at — they also do the work faster.

Features that contribute to this increase in efficiency are: Lighter weight. Low overall height. Longer feed. Positive dust-collection. Fast drilling speed.

Test the S-20 in your mine. See how it reduces roof-bolting costs. A demonstration can be arranged by contacting Schroeder Brothers, 3116 Penn Ave., Pittsburgh, Pa.; Acme Machinery Co., Williamson, West Virginia; Equipment Service Co., Inc., 617 North 9th St., Birmingham, Alabama. Or, you can contact us direct.

LE ROI Division of Westinghouse Air Brake Co., Milwaukee 1, Wisconsin, manufacturers of Cleveland air tools, Tractair, portable and stationary air compressors, and heavy-duty industrial engines. Write us for information on any of these products.



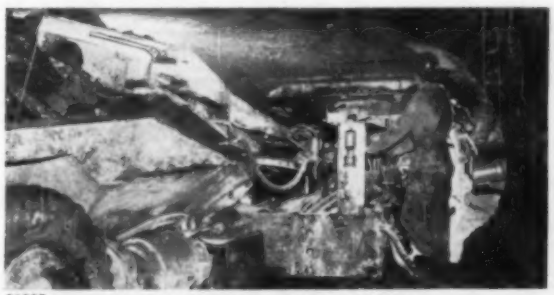
21565 Patented and patents pending

2403.4 tons in one day
with GOODMAN CONTINUOUS BORER

1159.8 TONS ON DAY SHIFT—1243.6 ON NIGHT SHIFT

With an 8 man crew, including roof bolters, mechanic and foreman, the average tons per man shift was 143.7 (day) and 155.3 (night).

These production figures were obtained just recently on retreat work in a midwestern operation. Mining height is 7 feet. Shuttle cars are used to take coal produced by borer to outby transportation system.



21367 Full hydraulic control for ease of handling.

21368 Path cut has narrow span of flat roof and arched sides. Bottom is wide.

This is the type of production that boosts profits, particularly when there are other borer advantages:

- **Easy maneuverability for fast development work as well as pillar recovery. Safe tramming clearances through retraction of cutting elements.**
- **Good size consist as coal is cut with bits contacting only small area of face.**
- **Concentrated working areas that require fewer man hours, less supervision.**
- **Safety by elimination of hazards associated with blasting, arched path for natural roof support, rapid advance to reduce possibility of roof deterioration.**
- **Low maintenance because of clean, simple design featuring large parts and a minimum of moving parts.**

Add up these advantages. Coupled with high productive capacity they are reasons why an investment in a Goodman Continuous Borer can be written off in a short time in terms of high tonnages at lower cost per ton.

GOODMAN
MANUFACTURING COMPANY
Halsted Street and 48th Place, Chicago 9, Illinois

CUTTING MACHINES • CONVEYORS • LOADERS
SHUTTLE CARS • LOCOMOTIVES • CONTINUOUS MINERS

Use Genuine Goodman Replacement Parts

1956 has, in many respects, been a record year for us . . . characterized by advances in technology and an all-time high in volume of new orders and also billings throughout the world. This meant a year of strenuous adjustment due to the necessity of increasing our productive capacity to parallel our growing volume of business.

The acquisition of the Merco Centrifugal Co. of San Francisco on February 1, added centrifugals to our product line. This natural outgrowth of our cyclone work has proven to be a most successful move. Similarly, the year has demonstrated the strength of our new Canadian subsidiary, Dorr-Oliver-Long of Orillia, which became the newest member of our corporate family on January 1, 1956. Yet another step in the overall corporate growth picture was the completion of plans to add the ninth member of our overseas family, Dorr-Oliver Pty. Ltd. of Australia on January 1 of 1957.

Steps in matching our productive capacity to our growing needs included a million dollar expansion of our Hazleton plant scheduled for completion at the year's end and the opening of a sizable new production facility nearby in Pennsylvania. Currently, a long term expansion and reallocation program is underway which will step-up our ability to produce, and to serve, still further.

Growth and change in other operating areas of the parent company also kept pace.

A broad reorganization of our domestic sales structure added new geographical divisions and was principally designed for better sales coverage and service. In engineering, the pressure of increased volume resulted in the opening of a branch engineering office in Pennsylvania, close by our East Coast plants, which has proven to be most worthwhile.

FERTILIZER — One of the highlights of the past year was the largest single D-O order ever received involving a phosphoric acid and 200,000 ton per year triple superphosphate plant for a Florida producer. The scope of our services on this project includes architect-engineer design, supply of equipment and construction materials, and supervision of erection and initial operation of the plant.

Other major design projects undertaken during the year were a 350,000 ton per year complete granular fertilizer plant in Great Britain, a 350 tc.) per day ammonium phosphate installation in Montana, and a phosphoric acid plant for Venezuela designed to produce 50 tons of P_2O_5 per day. During the year construction of a D-O engineered Scottish granular fertilizer plant was virtually completed, and Traveling Pan Filters were ordered for the difficult gypsum-phosphoric acid separation in a number of new chemical fertilizer plants around the world.

SANITATION — The new Spirovortex-Superate Filter will produce a degree of purity comparable to that attained using the activated sludge process in plants treating up to one MGD of domestic sewage. We have developed the Degritting Clarifier and Clarigester for low cost grit removal in small plants and during the year we have incorporated important new features into the design of our Vacuum Filters for the sanitary field.

The completely D-O equipped sewage treatment plant for Karachi, Pakistan, represents the largest order in the sanitary field ever entered by our associates in The Netherlands. Typical of other new D-O equipped installations are those under construction in such diverse locations as Charlottesville, Virginia; Caldwell, Idaho; Midwest City, Oklahoma; Delhi, India; Nairobi, Kenya; and Rio de Janeiro, Brazil. Expansion of Providence, Rhode Island, treatment facilities calls for installation of nine Dorr Clarifiers, all over 100 feet square, and at Louisville, Kentucky, four 275 foot long Monorake units will be added.

METALLURGICAL — Recently placed on the market, the DSM Screen is an ingenious, high capacity screen capable of separations as fine as 200 mesh. Adapted from the Dutch design, the unit has operated very successfully on coal and will handle a wide variety of non-fibrous feed slurries. Other highlights of the year include a number of Thickener-Filter combinations and Bowl Desiltors installed in Eastern coal fields, a D-O equipped iron ore washing plant in California, and a variety of cement plant expansion equipment orders.

RESEARCH AND DEVELOPMENT — As a matter of policy, fundamental research continues on our expanding line of basic unit operations. The principle of operating in many different but allied fields stimulates situations wherein fundamental research can produce new and useful products and processes. Such is not possible when interest is confined to but a few basic operations, as in our early years.

Similarly, general company development is continuing the search for new products allied in some manner with our experience and facilities. In this search we count heavily on the assistance and cooperation of our Associates throughout the world.

ALUMINA AND MAGNESIA — Plant expansions in both fields contributed heavily to the year's business as four of the world's major alumina producers in the Gulf Coast area and Jamaica ordered a total of 45 Filters, 20 Thickeners and 26 low pressure pumps of various types and sizes. In Michigan, three magnesia-from-brine plants will add a variety of agitation, filtration and thickening equipment; while a West Coast magnesia-from-sea water producer will employ extensive D-O equipment.

POLYETHYLENE — Our contribution to one of today's most spectacular and rapidly growing fields — polyethylene — is the Merco Pressure Centrifuge, developed specifically for high pressure, high temperature operation. The basic unit was developed, designed and manufactured in record time to keep pace with the expanding industry. First commercial Centrifuges will go on stream early in 1957 separating catalyst from liquid polyethylene.

FLUOSOLIDS SYSTEMS — A large steel producer in the United States finalized plans for a new fine coal washing plant using a two Reactor FluoSolids Coal Drying System designed to handle 600 tons of metallurgical coal per hour. In the non-metallics field, three fluidized Reactors went into operation — two in the Detroit area drying blast furnace slag used in cement manufacture, and the other calcining clay in Scotland. Systems are now under construction to dry and pre-heat oyster shells and to calcine Massachusetts limestone.

Four new installations in Japan will roast 265 tons of zinc concentrates daily, producing both a readily usable calcine and SO_2 bearing gases for contact sulfuric acid manufacture. During the year two installations in the U. S. and South Africa operated successfully roasting copper for direct electrowinning. And pyrite roasters were ordered for a Canadian uranium mill, Chilean and Nicaraguan copper concentrators, French and Philippine fertilizer plants, and two Scandinavian pulp mills. In all, 21 fluidized Reactors were sold in 1956.

URANIUM — Four new or expanding uranium mills in the United States and Canada will employ a wide variety of types and sizes of Agitators, Thickeners and Classifiers to perform the various leaching, dewatering and classification steps. One of these — a West Coast installation — will also install a d-i system to concentrate and purify uranium bearing solution.

INDUSTRIAL WASTES — D-O equipped treatment plants handling chemical wastes were installed by a German and two British chemical manufacturers. The former installation incorporates the first D-O equipment to be purchased for this purpose in Germany since World War II. Next year two Southern pulp mills will clarify wastes in giant 300 foot Thickeners installed in earthen basins, and a U. S. steel company will recover flue dust in a completely D-O designed installation. Two similar flue dust recovery stations were also ordered from our British subsidiary during the year.

The year's impressive record of sales and technical accomplishment has been made by the hard work of our staff in every corner of the globe. The success of our operations naturally rests wholly with them, despite the importance of the tangible facilities and tools with which we work. In the year now drawing to a close this was again demonstrated, and as the tools and facilities we give them expand and become of better quality, so will our staff be able to produce greater volume and increasing returns.

J. D. Hitch, Jr.
November 20, 1956 *President*

Power knife for cutting costs

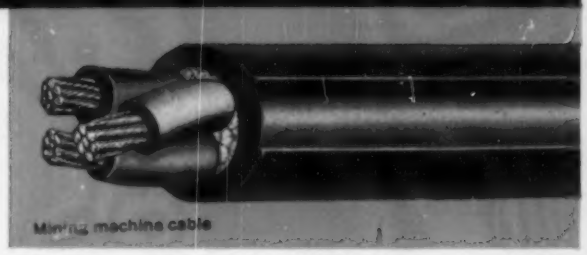
Coal cutters, and all other powered mining equipment, such as loaders, feeders, shuttle cars and drills, work toward the one big goal of safer, more economical production. Simplex-TIREX cords and cables are helping to achieve this goal in mines everywhere. They offer maximum flexibility, and their jacket of cured-in-lead Neoprene Armor resists abrasion, oil, heat and water, and gives longest life.

SIMPLEX WIRE & CABLE CO.,
79 Sidney Street, Cambridge 39, Mass.

Wire sculpture by Henry Szafarz

LIVE BETTER ELECTRICALLY

Simplex
TIREX



Mining machine cable

team up **JEFFREY SHUTTLE CARS**
and **JEFFREY BELT CONVEYORS**
for speedy, low cost coal transportation

A Jeffrey Class 66 shuttle car discharges coal directly into a Jeffrey 80-A belt conveyor at a large Kentucky mine.

Choose from these three classes of JEFFREY SHUTTLE CARS to match your mining height

They carry big payloads and haul the coal away *fast*. 4-wheel drive, 4-wheel steering and 4-wheel braking make them safe and easy to maneuver under every mining condition. All have hydraulically driven conveyor and cable reel. Conveyor can be run slow for "jogging" when loading, slow or fast when unloading, and its direction can be reversed.

Jeffrey shuttle cars are built for continuous, rugged service.

Class 68 in heights from 24" to 32"

Class 66 in heights from 30" to 48"

Class 67 in heights from 48" to 60"
Class 90 in heights from 44" to 56"

...and BELT CONVEYORS to meet your exact requirements from the complete Jeffrey line

Three types of head sections can be combined with three types of frames, giving you nine combinations to meet any belt conveyor requirement. Jeffrey engineers will help you select the right combination for each gathering, slope or main line haulage job.

These three husky head sections can transmit from 25 to 160 HP for belt speeds from 150 to 600 FPM. Tandem drive puts the conveyor belt in maximum contact with two gear-meshed drive pulleys for most efficient use of power on a long pull.

The three frames are built for belt widths from 26" to 36", and idler roll sizes range from 2 9/16" to 6" dia.

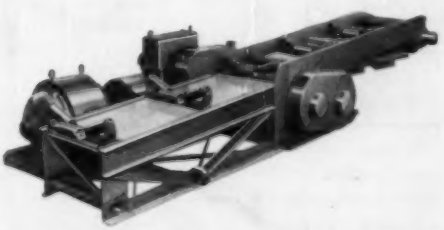
With Jeffrey shuttle cars and belt conveyors, you are assured of high-tonnage handling at low cost, less downtime and low maintenance.

The Jeffrey Manufacturing Company Columbus 16, Ohio

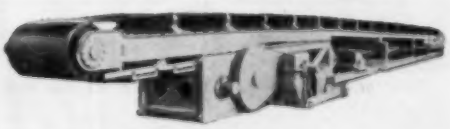
JEFFREY

MINING • CONVEYING • PROCESSING EQUIPMENT
TRANSMISSION MACHINERY • CONTRACT MANUFACTURING

52-B Head Section for 25 to 75 HP motors. 52-B frames are made for 26", 30", and 36" belts, and 2 9/16" or 4" diameter idler rolls.



64-A Head Section for motors up to 125 HP. 64-A frames are made for 30" and 36" belts, with 4" diameter idler rolls.



80-A Head Section for motor drives up to 160 HP. The 80-A frame is adaptable to 30" and 36" belts, and 4", 5" or 6" dia. idler rolls.

KOEHRING WORK CAPACITY *in action . . .*

At a Mid-West quarry, ¾-yard 305 loads out lannon stone. It's another in a new series of Koehring machines, and is similar in basic design to the modern new ½ and 1-yard excavators. Has full complement of standard attachments, on crawlers and rubber (see capacity chart below).

Plenty of pick-up — At an isolated camp in the Sierras, pumps and other machinery had to be unloaded and set in place. The heavy units required careful, precision-handling — and plenty of lift capacity. Above photo shows how they did it with a Koehring 15-ton 205 truck crane.

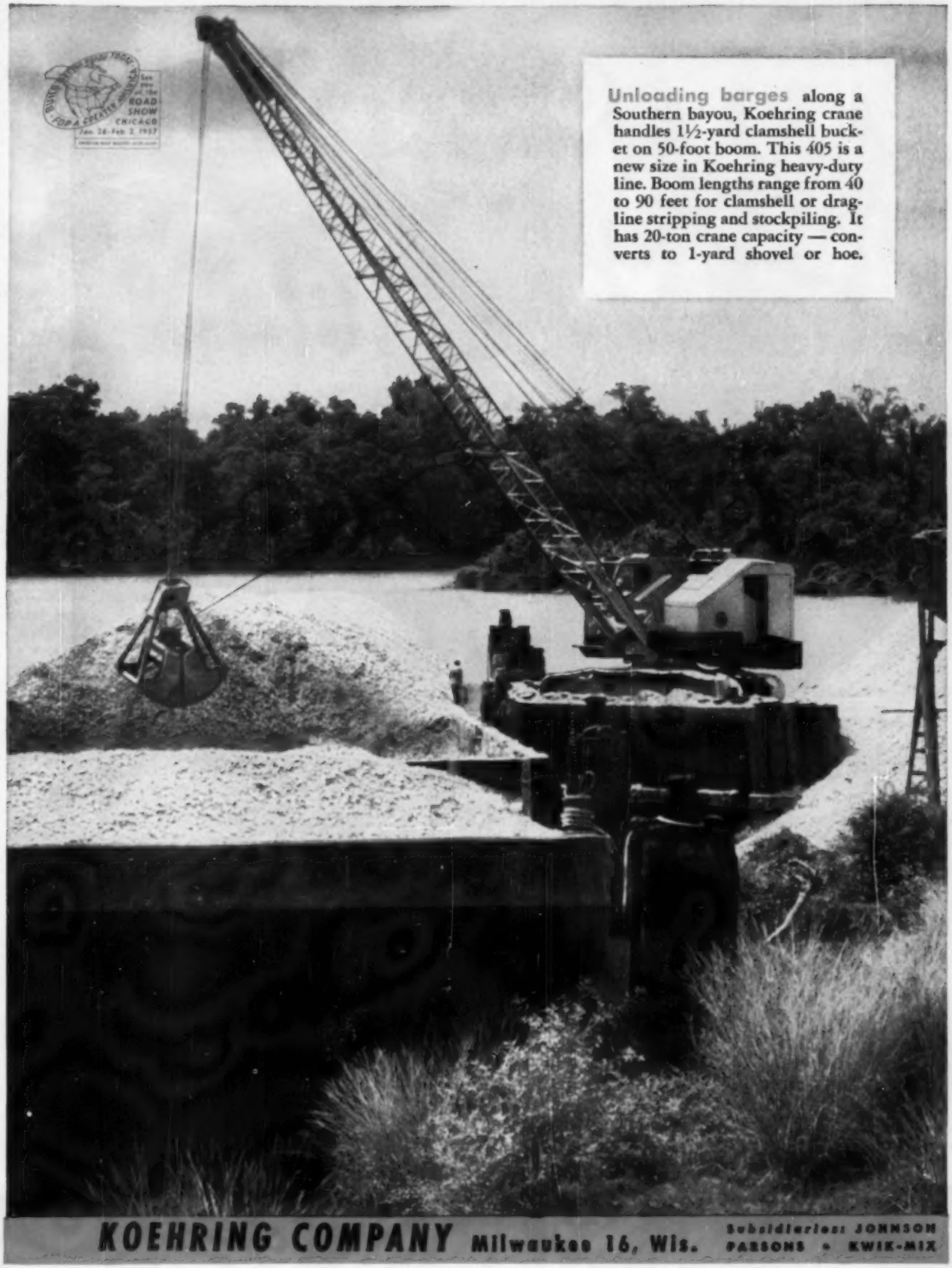
Here are some figures that will interest you:

KOEHRING MODEL	SIZE DIPPER	LIFT CAPACITIES (Crawler ratings based on 75% of tipping load. Rubber-tired machines — 85% of tipping load.)	
205 CRAWLER	½-Yd.	20,000 lbs.	at 10-foot radius
205 ON RUBBER	½-Yd.	30,000 lbs. 13,700 lbs.	at 12-foot radius at 20-foot radius
305 CRAWLER	¾-Yd.	30,000 lbs.	at 12-foot radius
305 ON RUBBER	¾-Yd.	50,000 lbs. 15,800 lbs.	at 10-foot radius at 30-foot radius
405 CRAWLER	1-Yd.	40,000 lbs.	at 12-foot radius
605 CRAWLER	1½-Yds.	72,300 lbs.	at 12-foot radius
1205 CRAWLER	3-Yds.	190,000 lbs.	at 13-foot radius

Want more information? Call Koehring distributor today.

K893

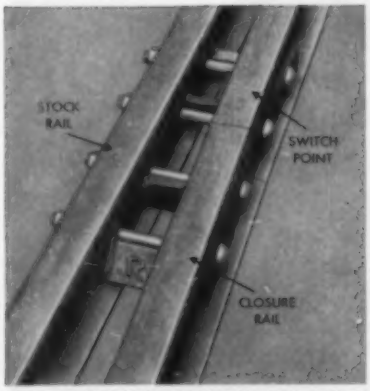
Big producer — Deep stripping uncovered a heavy coal vein at this Eastern mine. Working on mine floor, a Koehring 605 shovel loaded out the coal, and dumped into trucks spotted on upper level. Depending on materials, and type of operation, the 605 can be used with standard 22-ft. shovel boom and 16½-ft. dipper-sticks — or with high-lift 28-ft. boom and 23-ft. dipper-sticks.



Unloading barges along a Southern bayou, Koehring crane handles 1½-yard clamshell bucket on 50-foot boom. This 405 is a new size in Koehring heavy-duty line. Boom lengths range from 40 to 90 feet for clamshell or dragline stripping and stockpiling. It has 20-ton crane capacity — converts to 1-yard shovel or hoe.

KOEHRING COMPANY Milwaukee 16, Wis. Subsidiaries: JOHNSON • PARSONS • KWIK-MIX

Now—Bethlehem Heel Blocks for modern mine switches



Close-up of Bethlehem Switch Heel Block shows block in place between closure rail (right) and stock rail. Switch-point is at top of photo.

Haulage track in today's kind of mining world must be expertly engineered down to the smallest detail. This is especially true at switches, where derailment can prove extremely costly.

An important adjunct to any dependable, high-speed turnout is Bethlehem's new Switch Heel Block. This heel block, welded together from tough rolled-steel components, can be made to fit switches of any length, and rail of any weight. Properly installed, it will maintain gage at the heel end of a switch, keeping closure rail and switch point in correct alignment, both vertically and horizontally. All bolts can be tightened without interfering with lateral movement of switch points.

The Bethlehem Switch Heel Block is just one aspect of Bethlehem's comprehensive approach to mine-haulage improvement. Engineers in Bethlehem district offices are available to survey your workings or discuss your overall haulage problems. Many mines have turned the recommendations of Bethlehem engineers into money-saving investments. How about yours?

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

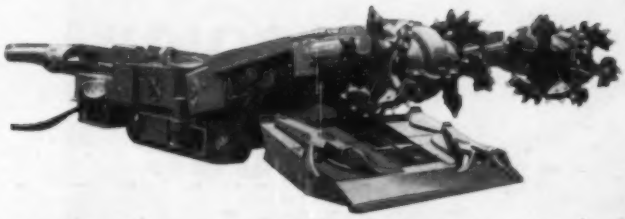
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

ONLY THE Lee-Norse MINER gives you

"PATTERN CUTTING"



The Lee-Norse Miner cuts a "DIAMOND PATTERN" in the face of the coal by simply revolving and oscillating the cutters at the same time. This is sometimes called "milling the coal off the face."

Every single Cutter Bit follows a right and a left spiral thread which produces the multiple criss-cross kerfs in the face of the coal. The diamond pattern is unique and very *important* because:

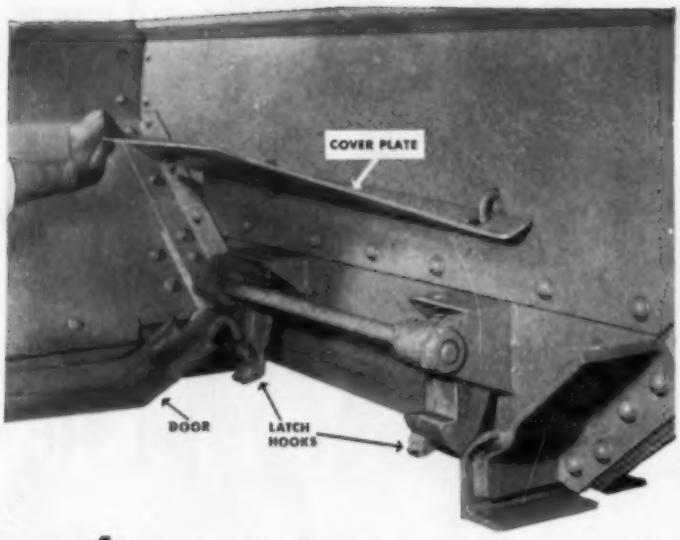
1. It cuts more coal with less power.
2. It produces coarse cuttings and less fines.
3. It is a simple and rugged mechanical device.
4. It instantly follows any variation in the thickness of the coal seam.
5. It is the ONLY REALLY NEW cutting tool introduced in recent years.

The Lee-Norse Miner is essentially a modern loading machine plus the most practical device for cutting coal. The Lee-Norse Miner loads all the coal from the floor with improved "dual" gathering arms and a flexible rear conveyor. Excellent clean-up . . . fast tramming.

Lee-Norse Company

CHARLEROI, PA.

DESIGNERS AND BUILDERS OF THE MINE PORTAL BUS



Only S-D Automatics give you these advantages

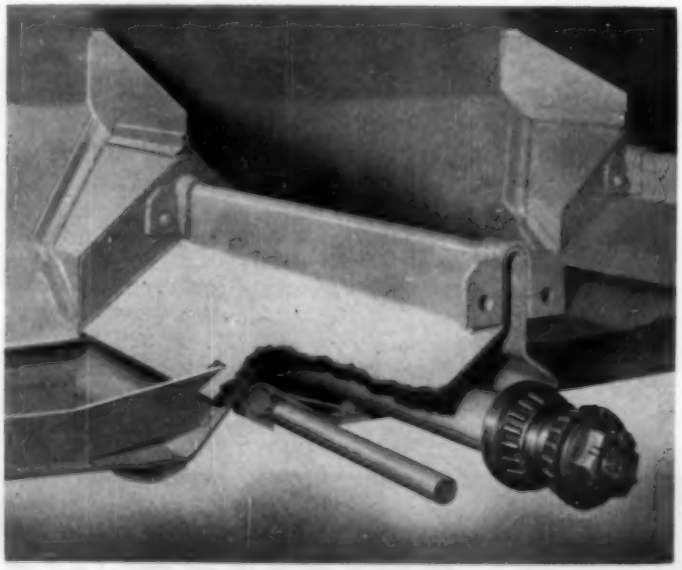
1 TWO LATCHES FOR SAFE AND SURE LATCHING! They are tripped simultaneously underneath car for automatic dumping. With S-D "Twin Safety Latches" your bottom dumping car doors are actually padlocked twice. These latches (see photo above) are tripped independently by a pair of tripping devices mounted between the rails. (Note the tripping devices shown in bin photo on opposite page.) Both latches must be tripped simultaneously before the doors open. This eliminates doors opening accidentally anywhere along the haulage route.

1 "Twin Safety Latches" for safe and sure latching

2 Safety Sealed against dust leakage

3 ¼ to ½ ton more capacity per car for the same overall dimensions

2 SEALED AGAINST DUST LEAKAGE! Sanford-Day's exclusive bottom dumping car seal means two extra values: (1) Sealed S-D Automatics give you a new, safer in-the-mine operation by eliminating leakage of dust. (2) Sealed S-D Automatics enable you to make a tremendous reduction in track clean-up costs. Cross-sectional view at right points out how the flares extend over doors when closed, sealing material in car.



3 ONE-QUARTER TO ½ TON MORE CAPACITY PER CAR FOR THE SAME OVERALL DIMENSIONS is available only in S-D Automatics because of the construction features of Sanford-Day's exclusive bottom dumping car design. If you were buying, for example, 16 bottom dumping cars of any other make with a 4-ton level full capacity, you would need only 14 S-D Automatics of the same overall dimensions to haul the same tonnage. You would save two cars in every 16 . . . 12½ percent in original investment . . . 12½ percent in maintenance . . . 12½ percent less dead weight to haul. Any one of our sales engineers will demonstrate to your complete satisfaction just how we are able to give you this extra capacity.

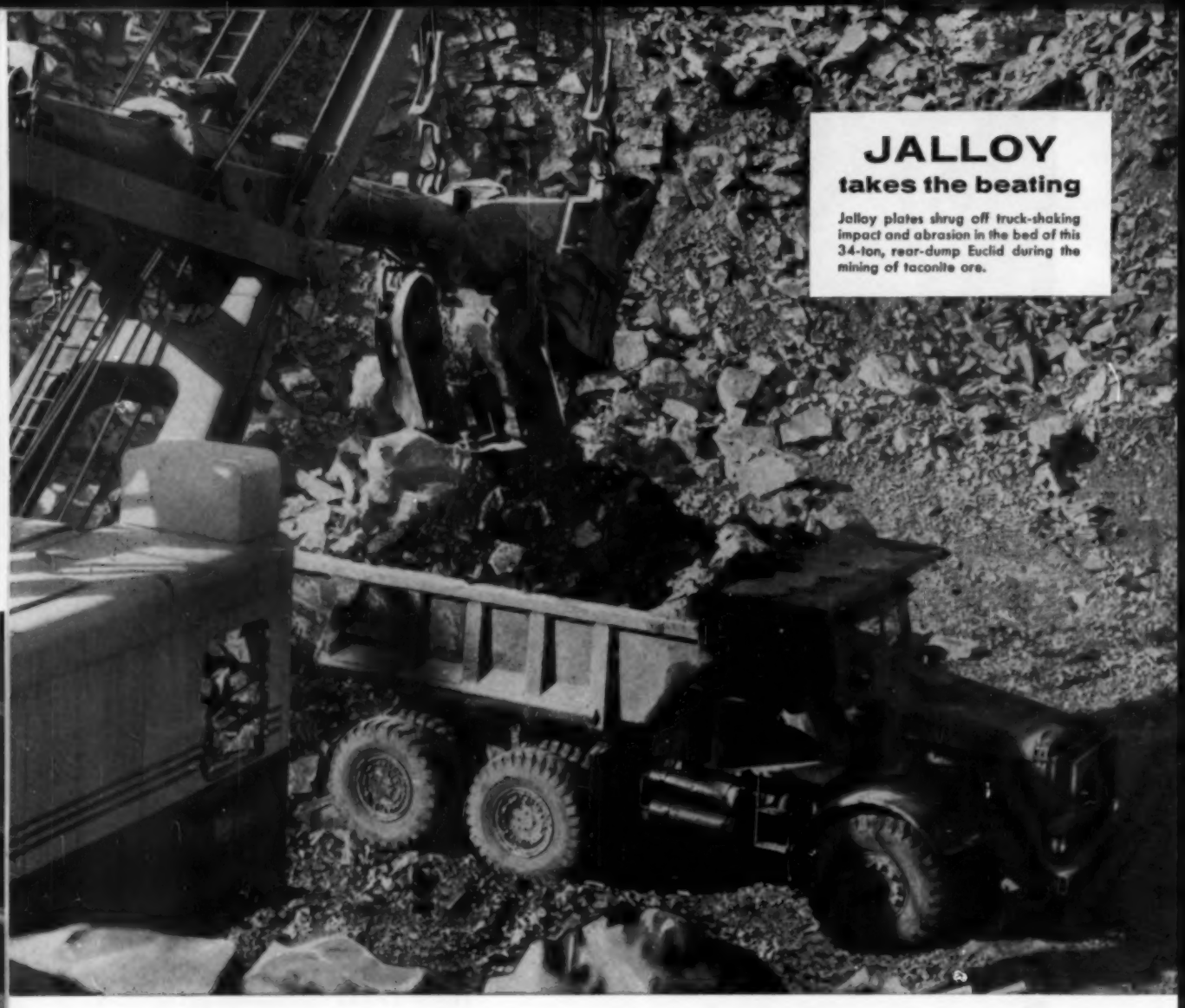
THESE THREE fundamental and necessary advantages are offered only by S-D Automatics! They mean that only S-D Automatics can haul coal out of your mine at the lowest possible cost! Assure yourself of the maximum economies bottom dumping cars offer you by buying S-D Automatics! For complete information, write or call us today. Sanford-Day Iron Works, Inc., P. O. Box 1511 . . . Telephone 3-4191, Knoxville, Tenn.

Sanford-Day IRON WORKS

KNOXVILLE • TENNESSEE

AND BROWN-FAYRO DIVISION

MINE CARS, All Types - PRECISION WHEELS - "Brownie" HOISTS CAR RETARDERS - SPOTTERS PUMPS - OIL SPRAY SYSTEMS



JALLOY
takes the beating

Jalloy plates shrug off truck-shaking impact and abrasion in the bed of this 34-ton, rear-dump Euclid during the mining of taconite ore.

Jalloy heat treated steels . . .
cut maintenance—give longer wear life

Jalloy—special purpose steels that are heat treated to provide longer wear on applications where impact and abrasive conditions are severe—last 4 to 20 times longer than conventional mild steels. Furthermore, they are easily welded.

Jalloy is available in three grades:

No. 1—for applications requiring excellent formability or where a low carbon alloy steel possessing good physical properties before or after heat treatment is specified. This is an ideal carbonizing grade.

No. 3—a general purpose steel capable of being heat-treated to excellent physical properties. Compared to ordinary mild steels it offers good resistance to abrasion or wear in the as-rolled state; but when heat treated to Brinell 340 and above, optimum abrasion and impact resistance is secured.

No. 7—possesses high hardness together with good ductility or wear resistance. Excellent for spring applications as well as flat work.

Jalloy high strength steels are available as plates, structurals, bar and small shape sections, hot rolled sheets, as well as strip and wire products.

• • •

Complete data concerning *Chemical Composition . . . Heat Treatment . . . Weldability . . . Physical Properties . . .* will be mailed to you promptly. Write today for your copy.

Jones & Laughlin
STEEL CORPORATION · PITTSBURGH

J&L STEEL

STANOLITH Grease gives coal a smooth ride

Over 5,000 bearings need just one grease. Never a bearing lubrication failure.

Part of the coal for the Wabash River Generating Station operated by the Public Service Co. of Indiana near Terre Haute, comes directly from the Viking Coal Mine Processing Plant via a conveyor system. The system operates 365 days a year moving up to 4,800 tons of coal per day. STANOLITH Grease has been used to lubricate all bearings in the conveyor system since February 3, 1953, the start up day. In all that time there has never been a bearing lubrication failure.

Prior to the initial operation of the conveyor system, maintenance supervisors checked with Paul Manning, Standard Oil industrial lubrication specialist, about lubricating the new installation. Paul, they knew, has extensive experience (21 years) in handling lubrication problems of this kind. Working with plant management, Paul recommended STANOLITH Grease No. 42 for the job. STANOLITH Grease has fulfilled maximum expectations.

STANOLITH Grease is a smooth textured grease. It is made from highest quality oil, lithium soap and special additives. It resists water washing and water contamination. STANOLITH Grease works well in exposed, outdoor installations. It will not channel. It is chemically stable. It can be applied easily by hand, gun or pressure system.

Find out more about STANOLITH Grease. Talk to your Standard Oil industrial lubrication specialist. There is one near you in any of the 15 Midwest or Rocky Mountain states. Or write 910 South Michigan Avenue, Chicago 80, Illinois.

***Quick facts about* STANOLITH Grease**

- Water resistant
- High temperature resistant
- Pumpable in grease gun or pressure system
- Mechanically stable

STANDARD

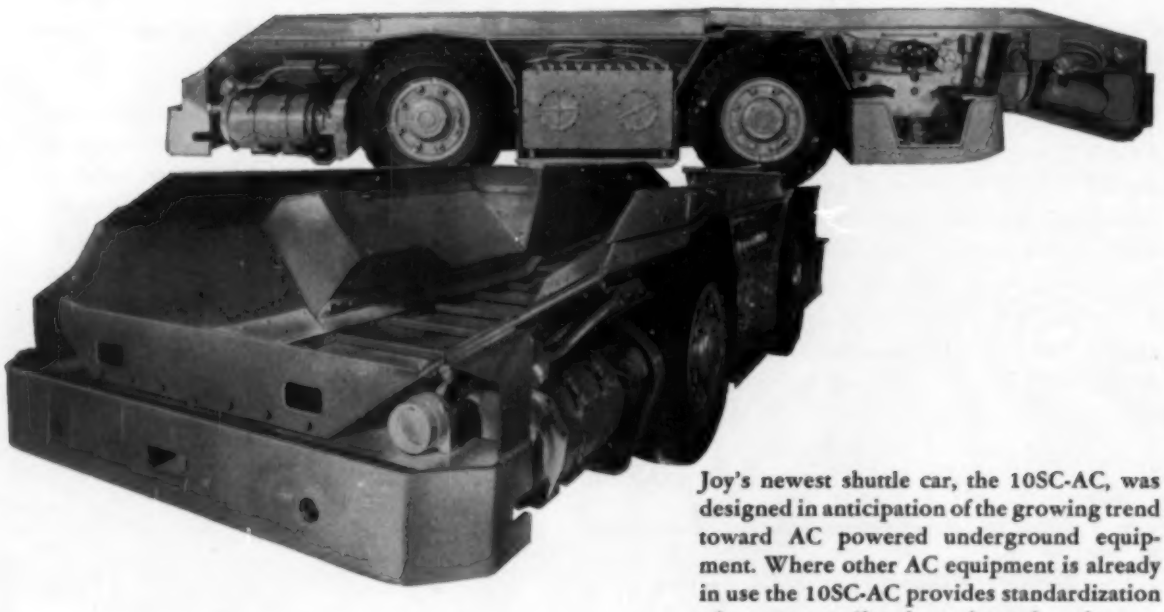
STANDARD OIL COMPANY
(Indiana)

Part of coal conveyor system at Wabash Power Plant, Terre Haute. Entire conveyor is lubricated with one grease —STANOLITH. No bearing failures experienced during the 3½ years conveyor has operated.

A NEW SHUTTLE CAR

the JOY 10SC-AC

IN OPERATION SINCE MID '56



Joy's newest shuttle car, the 10SC-AC, was designed in anticipation of the growing trend toward AC powered underground equipment. Where other AC equipment is already in use the 10SC-AC provides standardization of power supplies throughout the mine . . . makes stocking and purchasing problems simpler. But more important, the 10SC-AC brings the powerful performance and extremely low maintenance of AC motors into the shuttle car field for the first time.

Two constant-horsepower, 2-speed traction motors, rated at 40 horsepower each, drive the car . . . eliminating all clutches, transmissions, and cross-drive shafts. Shifting is done automatically, electrically . . . fewer mechanical parts . . . less maintenance. Two constant-torque, 2-speed conveyor motors, 15 horsepower each, power the conveyor by direct drive without complicated transmission systems or complex gearing. These design features closely follow the proved design of Joy's DC driven car, the 10-SC, operating in the field for almost ten years.

4-wheel drive and 4-wheel steering makes the 10SC-AC extremely maneuverable in closely timbered areas.

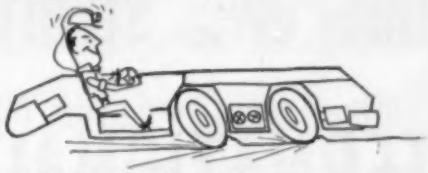
See it at the COAL SHOW

WBW CL 6419-144

——operating on ALTERNATING CURRENT

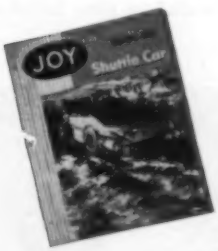
The Joy 10SC-AC car easily carries 10 tons of material even on rough bottoms.

LESS MAINTENANCE—Alternating current motors are trouble free—no servicing of brushes, brush holders and studs . . . not even hand holes on the motors.



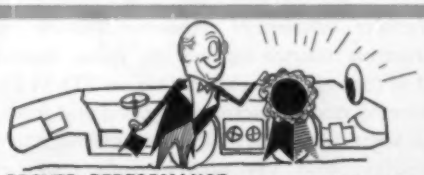
REGENERATIVE BRAKING—Standard equipment on the 10SC-AC. On down-grade, braking automatically occurs when motors are driven over their synchronous speeds.

SAME SPEED LOADED OR EMPTY—AC motors power the 10SC-AC at almost the same speed whether loaded or empty . . . keeps several cars on an even cycle . . . eliminates jams and waiting at loading point.



WRITE FOR BULLETIN 144-1

A complete description of the 10SC-AC including dimension drawings, specifications and performance curves.



PROVED PERFORMANCE—The basic design of the car is the Joy 10-SC . . . in the field since 1948. New 10SC-AC's are now working coal.

JOY MANUFACTURING COMPANY, OLIVER BLDG., PITTSBURGH, PA.

EQUIPMENT FOR MINING . . . FOR ALL INDUSTRY

CONTINUOUS MINERS

COAL LOADERS

COAL DRILLS

COAL CUTTERS

Here's why more and more coal strippers are repowering with Planet-Power steered INTERNATIONAL® TD-24 crawlers!

See for yourself how a TD-24 can boost your operating profits! Compare seconds-fast, all-weather TD-24 gasoline conversion diesel starting—to slow methods that pile up costly delays. Note how Cerametallic engine clutch action reduces operating effort, gives top *power-transfer efficiency!* Measure TD-24 power-weight-traction balance against any other machine in any kind of footing. See what exclusive TD-24 Planet-Power steering does to increase *payload* and *job-speed.*

At the same time, prove the excavating and loading capacity, and *versatility unlimited,* of an International Drott Four-In-One Skid-Shovel. See your International Construction Equipment Distributor for a demonstration.

INTERNATIONAL® CONSTRUCTION EQUIPMENT

International Harvester Co., 180 N. Michigan Avenue, Chicago 1, Illinois

A COMPLETE POWER PACKAGE INCLUDING: Crawler, Wheel, and Side-Boom Tractors... Self-Propelled Scrapers and Bottom-Dumps... Crawler and Rubber-Tired Loaders... Off-Highway Trucks... Diesel and Carbureted Engines... Motor Trucks.

"Major reasons: capacity and service"

—Byron Construction Co., Clarksburg, W. Va.

This coal field contractor uses five TD-24's to clear right-of-way, build roads and strip overburden on a large bituminous coal-stripping operation near Lost Creek. The TD-24's remove an average depth of 90 feet of slate, limestone, sand, and earth overburden—to uncover 5-foot Pittsburgh and 8-foot Redstone, seams.

Four of the TD-24's are new, replacing four competitive crawler-dozer units. The other TD-24 in the fleet has done 7,500 hours of heavy, crawler-mauling coal field work—since '52!

"Work capacity and distributor service were major reasons for buying the four new TD-24's," reports Tony Petitto, Jr., for Byron Construction Company! ...Photo shows two of their new TD-24's—leveling spoil-bank so a dragline can "walk" to new location.

"TD-24's do more work, faster"

—Buckeye Coal Co., Hanging Rock, Ohio

On the extensive Buckeye Coal Company operation, near Ironton, Ohio, two large draglines, and two International TD-24's strip overburden 40 feet deep from the 40-inch "Ohio No. 5" seam. The operation produces 1,000 tons of steam coal daily.

"Our TD-24's do more work, faster, than other large crawlers we've had on the strip," states C. E. Collins, Buckeye Coal Company partner. "This performance explains our *repeat* buying. We replaced one TD-24 with a new one, added another new one, and have a third one on order."

Exclusive International Planet-Power steering gives you full-time "live" power on both tracks—to turn *under positive control*, pulling or pushing big payloads!

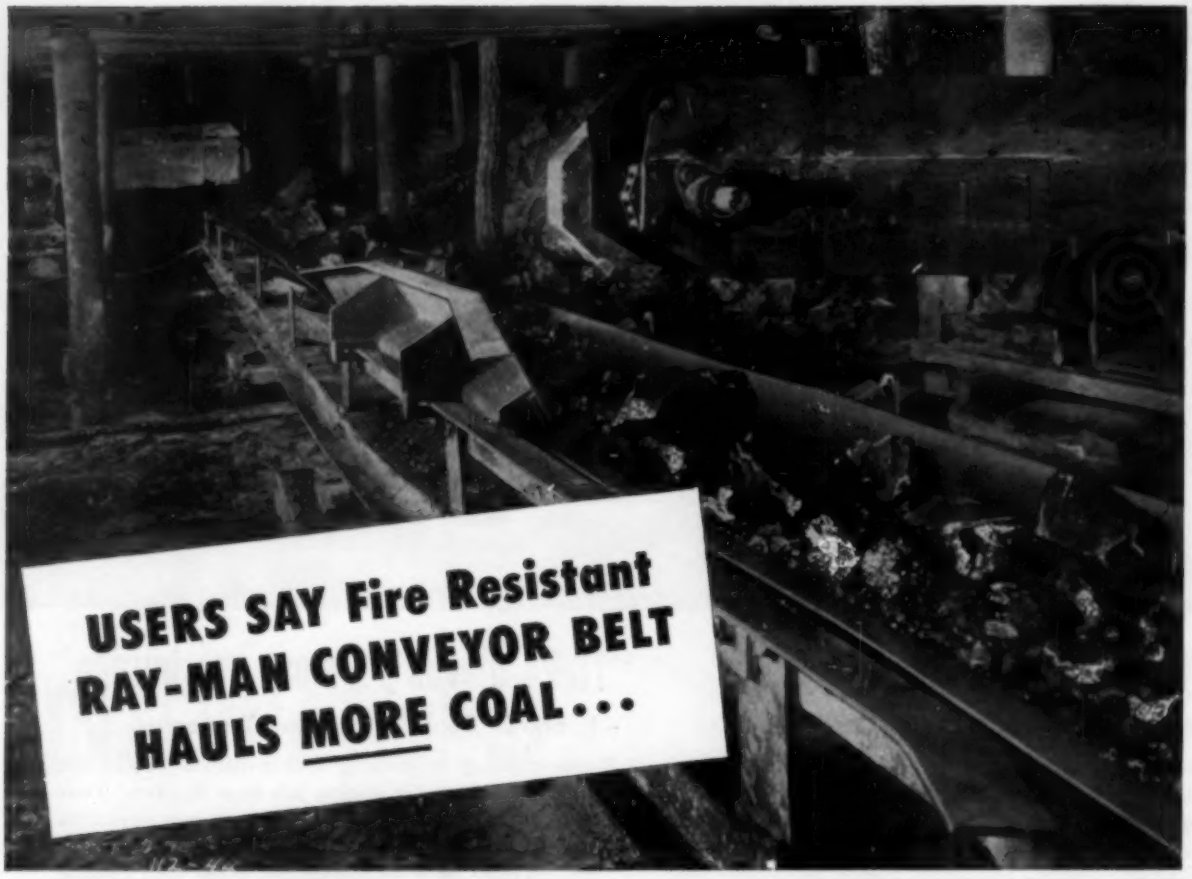
"TD-24 moves 1/3 more overburden"

—B. and H. Coal Co., Spencer, Tennessee

Bonus capacity is the key reason why a TD-24 got (and keeps) this big dozing job near Spencer, Tennessee. Up to 35 feet of overburden are stripped to uncover the 4-to-8-foot "Swanee" seam.

The TD-24 with hydraulic tilt dozer, and a large power shovel team up on the stripping—to provide a profitable combination.

"Our TD-24 dozer is moving up to one-third more overburden daily, than previous large tractors," reports B. and H. Company partner, C. L. Brock. "This increase results from greater weight (for full-power traction), full-time power on both tracks while steering, and tilting blade to speed digging in hard materials."



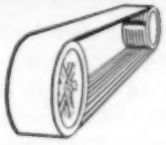
...Gives you "More Use per Dollar"

R/M engineering makes the difference! Special cushioned strength members are made of newest special industrial fibers. Strong, resilient outer plies are double compensated to relieve stress and provide exceptional flexibility. Ray-Man Conveyor Belt trains naturally, troughs easily . . . handles *fuller, heavier* loads even where small pulleys are required in low-head room installations!

Resists gouging, tearing and ripping better than other constructions. Requires no breaker strip. R/M's exclusive "XDC" Cover gives the belt much greater protection against wear, tear, cuts and abrasions. It's mildew-proof, moisture resistant and—*now*—available in special construction with Bureau of Mines' acceptance designation: "Fire Resistant, U.S.B.M. No. 28-10." You can't use a *better handling, longer lasting . . . safer* belt in your underground mining operations!

Let an R/M representative show you special advantages of other feature R/M conveyor belts . . . extra-cushioned Homocord, for unusually abrasive shock loading . . . R/M Tension-Master for extra long slope lifts, high tensions. Whatever your requirements, if you *specify* R/M Conveyor Belts . . . you *get* "More Use per Dollar." Write for Conveyor Belt Bulletins.

More Dependable Mine Drives with R/M *Poly-V*®



This patented new concept in heavy duty drive transmission delivers up to 50% *more* power in the *same* space as ordinary V-belts . . . *equal* power in *less* space! It employs a *single*, V-ribbed belt . . . eliminates "matching" problems . . . cuts belt and sheave inventories to a new low! Write for a copy of Poly-V* Drive Bulletin #6638 *today!*

**Poly-V is a registered Raybestos-Manhattan trademark.*

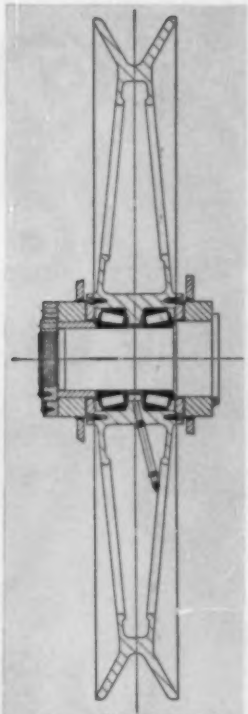
RM-710

BELTS • HOSE • ROLL COVERINGS • TANK LININGS • INDUSTRIAL RUBBER SPECIALTIES

MANHATTAN RUBBER DIVISION—PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.

Other R/M products: Abrasive and Diamond Wheels • Brake Blocks and Linings • Clutch Facings • Asbestos Textiles • Mechanical Packings • Engineered Plastics • Sintered Metal Products • Industrial Adhesives • Laundry Pads and Covers • Bowling Balls



How **THE MARION POWER SHOVEL COMPANY** mounts sheaves on Timken bearings . . . to take radial, thrust loads in all combinations, keep heavy-duty sheaves in positive alignment.

World's largest shovel scoops 90 tons, lifts it 10 stories moves it 290 feet on 34 TIMKEN® bearings

BUILT by the Marion Power Shovel Company, this gigantic "coal miner" moves many tons of overburden per hour for the Hanna Coal Company. With 10 motors controlling the digging cycle of the 90-ton capacity dipper—an additional 4 motors for its 8 powerful cat treads—built-in elevator—auxiliary crane for hoisting equipment aboard—this tremendous earth mover is 100 times larger than the ordinary construction shovel.

34 Timken® tapered roller bearings carry terrific radial and thrust loads in all combinations, at critical points—including swing machinery and all hoist sheaves. Full line contact between rollers and races gives extra load-carrying capacity. And because Timken bearings have case-carburized rollers and races—shock-resistant cores under hard, wear-resistant surfaces—they take heavy shock loads. Designed to roll true, precision manufactured to live up to their design, Timken bearings practically eliminate friction, reduce wear on integral parts. Closures are more effective, too, because Timken bearings keep housings and shafts concentric, keeping lubricant in, dirt, dust, water out.

When you buy or build machinery, look for the "TIMKEN" trade-mark on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.

TIMKEN *TAPERED ROLLER BEARINGS ROLL THE LOAD*

TRADE-MARK REG. U. S. PAT. OFF.

In Ohio . . . . and the World Over

Bucyrus-Erie Ward Leonard Electric Excavators

KEEP COSTS DOWN . . . KEEP OUTPUT UP

Bucyrus-Erie Ward Leonard electric excavators are helping coal operators everywhere with their modernization plans to boost output while cutting costs. For example, the 150-B shown above is loading unshot coal for the Sunnyhill Coal Co., near Lexington, Ohio.

These modern machines are designed to meet today's production problems. The front end has plenty of strength without dead weight — material can be moved with less effort and power consumption. Ward Leonard control provides rapid acceleration and deceleration to help achieve high-speed digging cycles. There is plenty of extra torque and ample usable power when most needed.

Plan to bring the advantages of these modern shovels to your operations. 91L56

GLOBAL APPROVAL
MOROCCO · PHILIPPINES · RHODESIA · UNITED STATES · VENEZUELA · ALGERIA · CANADA · CONGO · ENGLAND · FINLAND · FRANCE · INDO-CHINA
110-B 4½-cu. yd.
150-B . . 6-cu. yd.
190-B . . 8-cu. yd.
BUCYRUS ERIE

Bucyrus-Erie Company

South Milwaukee, Wisconsin

This GIANT sleeps just once a year

-on Christmas Day

Built at a cost of $2,600,000 by Marion Power Shovel Company, *The Mountaineer* costs $1,000 an hour when idle. As a result, it just isn't permitted to be idle—except on Christmas Day. The rest of the year, it works 24 hours *every day* at the world's largest strip mine, owned by Hanna Coal Company.

Tough, durable USS "T-1" Steel in the dipper, dipper stick, bail and crowd rack helps *The Mountaineer* do more work than any other power shovel in all the world. This machine can pick up 90 tons of overburden in one bite, pile it 290 feet away, to a height of 100 feet, and swing back for another 90-ton load—all in just 45 seconds! Working at this rate, it can move 7 million yards of overburden a month.

And every yard is tough going. USS "T-1" Steel parts must ram through rock and earth, taking terrific impact and shock, even in the dead of winter. They hold up in this service because USS "T-1" Steel retains its amazing toughness at temperatures far below zero . . . and has excellent resistance to impact abrasion.

Weight was saved with USS "T-1" Steel too—a total of 40 tons!—because of its very high yield strength of 90,000 psi and its excellent weldability. In spite of the high strength, Marion had no difficulty welding, forming, and machining this high-quality alloy steel.

• • •

USS "T-1" Steel can help *you*. Consider it where you need high strength, extraordinary toughness, resistance to impact abrasion, or good creep rupture strength *combined* with ease of fabrication. We'll gladly help you adapt it to your particular problem. United States Steel, Pittsburgh 30, Pennsylvania.

USS "T-1" CONSTRUCTIONAL ALLOY STEEL

UNITED STATES STEEL

UNITED STATES STEEL CORPORATION, PITTSBURGH
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
UNITED STATES STEEL SUPPLY DIVISION,
WAREHOUSE DISTRIBUTORS, COAST-TO-COAST
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS

Specially designed cars of USS COR-TEN Steel to haul 25,000 cu. yds. of rock from Moffat Tunnel

These Granby-type automatic side dumping cars, specifically designed for tunnel work, are being used in the enlargement of the Moffat Tunnel pioneer bore at East Portal, Colorado. The tunnel, which will carry water from the western slope of the Rockies to the eastern slope and thence to Denver, is being cement lined and enlarged for a distance of 2½ miles. This will necessitate the removal of approximately 25,000 cu. yds. of rock.

The 3½-cu. yd. capacity cars, designed to operate in a tunnel of limited width, are constructed of ¼-in. COR-TEN Steel body plates and ⅜-in. COR-TEN Steel structural members.

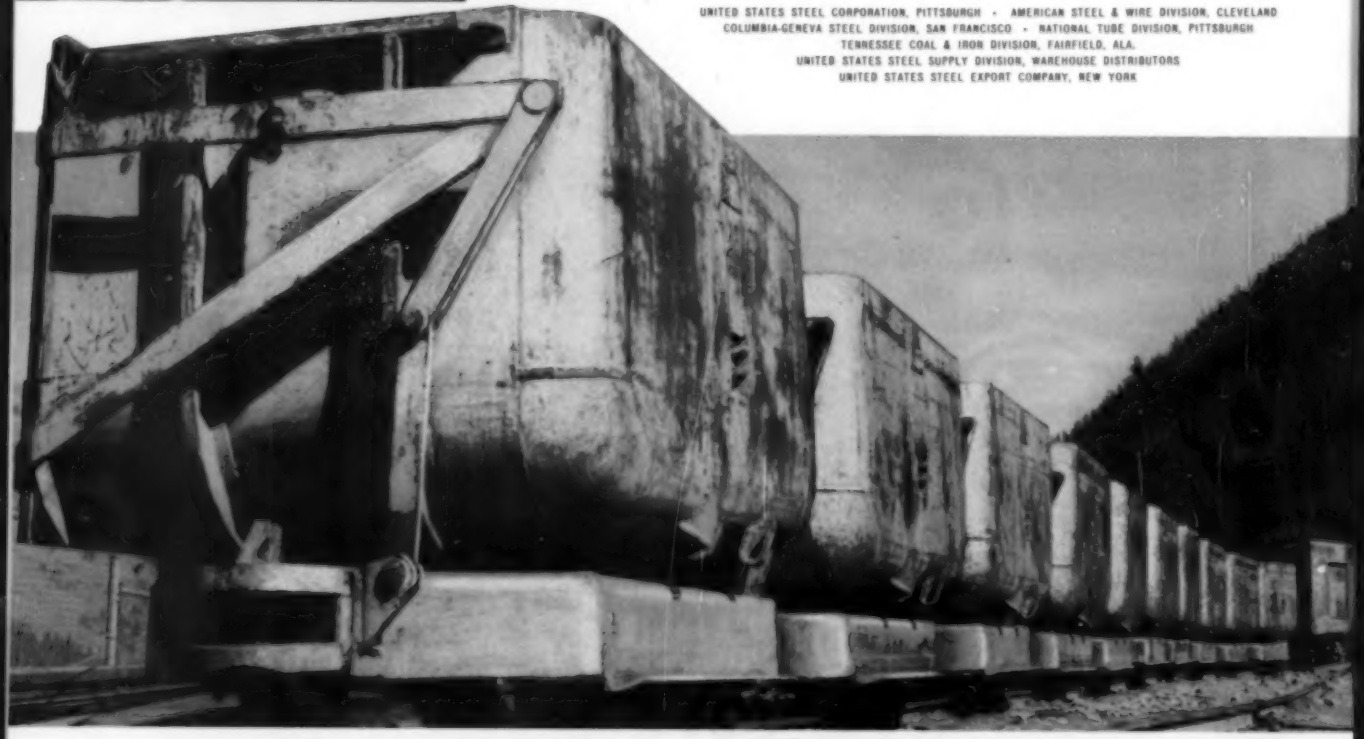
These cars are not new. They have already been in service for over six years carrying rock and muck from other Colorado water tunnels. Yet, they are still in excellent condition despite their wet, rugged past. The reason is, of course, the USS COR-TEN Steel used in their construction. USS COR-TEN Steel offers 4 to 6 times as much resistance to atmospheric corrosion as carbon structural steel. Under conditions such as those encountered on this tunnel project, frequent alternate wetting and drying occurs, which accelerates the corrosion process. USS COR-TEN Steel's superiority in this respect is invaluable for this type of service. Moreover, it possesses the high strength needed to bear up under the daily pounding of heavy, abrasive rocks.

United States Steel produces three grades of USS High Strength Steel—COR-TEN, MAN-TEN and TRI-TEN "E." Each grade has its own special characteristics and each is recommended for certain end uses where it will give longer service and greater economy. Yield point of these three steels is 50% higher than that of carbon steel, and, in varying degrees, they offer greater resistance to wear, fatigue, abrasion and impact, and better resistance to atmospheric corrosion.

USS High Strength Steels are used to replace carbon steel in the vital parts of mine cars, dozers, shovels, drag lines and other such equipment to increase service life without increasing dead weight. Where the use of thinner sections is feasible, they can frequently (1) reduce equipment weight without reducing its strength, or (2) increase the size and capacity of equipment without increasing the total weight of the power needed to move it.

For further details on USS High Strength Steels, write to United States Steel, Room 2801, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

UNITED STATES STEEL CORPORATION, PITTSBURGH · AMERICAN STEEL & WIRE DIVISION, CLEVELAND
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO · NATIONAL TUBE DIVISION, PITTSBURGH
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK



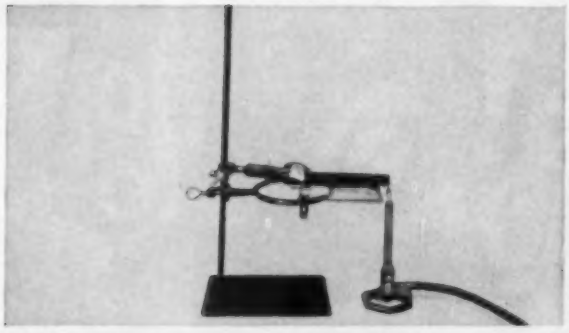
USS HIGH STRENGTH STEELS

USS MAN-TEN · USS COR-TEN · USS TRI-TEN

UNITED STATES STEEL

AT U. S. BUREAU OF MINES:

NEOPRENE CONVEYOR BELTS PASS THE TESTS FOR FIRE RESISTANCE!



FLAME TEST determines whether or not belt will spread flame if exposed to a fire. Belt specimen is held in a Bunsen burner flame for one minute in still air. Burner is turned off after one minute, and air is blown across specimen at 300 ft. per minute. Flame from specimen must not last more than one minute; afterglow must not last more than three minutes. Neoprene belts are self-extinguishing well within the permissible limits for flame and afterglow.

FRICTION TEST determines whether or not frictional heat can start a belt fire if belt jams and drive pulley continues to turn. Belt specimen is draped over pulley driven at 110 rpm and one end of specimen is clamped to floor. Weights are added periodically to other end during 2-hr. test until total of 270 lbs. is reached. Thermocouples in belt measure temperature; 300 ft./min. air current is blown across belt. Specimen must not flame, glow or reach temperature above 250°C. Neoprene belts run cooler than other belts and show no signs of flame or glow.

* * * *

NEOPRENE BELTS OFFER MORE THAN FIRE RESISTANCE ALONE

"Fire-resistant USBM" on conveyor belting means that it has been tested for flame resistance and accepted for listing by the U. S. Bureau of Mines. But if it carries this label *and* is made of neoprene, the belting gives you *more* than just flame resistance.

For years, the rubber companies that make your conventional belting have been making neoprene belting for use where service conditions cause ordinary belting to deteriorate. It resists sunlight and weathering, and won't soften if oil or grease get on it. Of course, it resists cutting and abrasion.

No increase in belt tension is needed with neoprene belting, since its coefficient of friction is similar to that of rubber. It runs as smoothly as conventional belting, even in cold weather, and has the proper troughing characteristics for carrying coal.

Next time you order conveyor belting, get more than fire resistance alone—get neoprene!

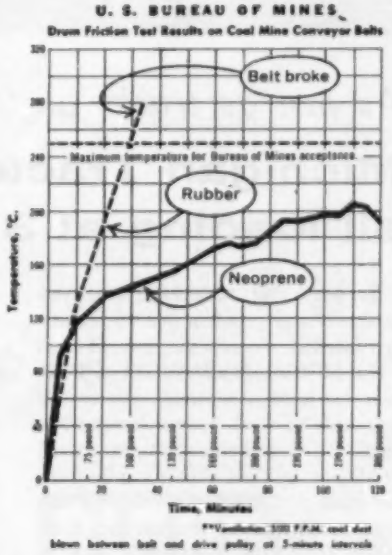
NEOPRENE BELTS DISSIPATE HEAT... The chart at the right shows typical results of drum friction tests on neoprene belts and on the rubber belts ordinarily used for underground conveyors. After a neoprene belt reaches a temperature range of 180°-220°C., its heating curve levels off to a nearly constant value—despite increased friction by the addition of weights.

NEOPRENE

The rubber made by Du Pont since 1932

DU PONT

REG. U. S. PAT. OFF.



BETTER THINGS FOR BETTER LIVING...*THROUGH CHEMISTRY*

As fast as trucks on 9-mile cross-town trip . . .

Michigan Tractor Shovels handle all loading at 3 scattered pits

Suppose that sometime soon you have the same problem that 15 months ago faced A. Courchesne, Inc., El Paso (Texas) commercial rock firm. Business has boomed so much you find it profitable to work several locations at once. (In Courchesne's case, he started producing railroad ballast a mile from his main pit, and began crushing colored roof stone at another site nine miles from the pit.) Slow-moving crawler-loaders, you know, aren't practical for working at more than one location. Purchase of more crawlers costs more than you want to spend. So what do you do?

Do what Courchesne did and your problem is solved!

Performance earns repeat order

Courchesne traded a crawler-loader for his first Michigan, a 1⅜ yard Model 125A, 15 months ago. Its performance was so good that when business continued to boom, he bought another Michigan, both from local distributor Contractors' Equipment & Supply Co.

Output averages over 1,500 yards daily

Today, the two Michigans load 1,500 to 2,000 cubic yards of stone every 8 hour day. The owners say each *equals* a *1¼ yard power shovel* in output. Each works at three or four locations per shift, depending on customer re-

Michigan Tractor Shovel has ample power to load all the many kinds of stone produced at Courchesne's three pits . . . . . limestone flux for smelters . . . sand and concrete aggregates for building . . . slag ballast for railroads . . . gravel for water-well packing . . . crushed red, buff, green, and "glitter-white" stone (shown here) for built-up roof construction. The two Michigan Tractor Shovels combine to load 1,500 to 2,000 cubic yards per eight-hour day.

Three passes of Michigan's 1⅝ yard bucket heap the company's 5 yard dump truck. Despite rugged use, Owner Tom Courchesne reports both Michigans "amazingly trouble-free. And," he says, "these mobile units have let us gear our loading to the flexibility of our sales . . . something never before possible in the 69 years we've been in business."

quirements. And speed! According to General Superintendent Mike Barrueta, either Michigan can leave a pit together with the company's five-yard dump trucks, travel through city traffic on its own rubber, and be at the new loading site *at the same time as* the trucks. Power steering and smooth-acting four-wheel power brakes allow the Michigan Tractor Shovel to make full use of its 27 mph speed on concrete pavement, blacktop, cross-country trails, or on the pit floor.

Many other Michigan owners have similar speed and production advantages to report from their Tractor Shovels. The complete power-train—torque converter, non-stop power-shift transmission, shock-reducing planetary axles—was designed and built entirely by Clark, specifically engineered to give more useable speed, power and traction than you've ever seen on a rubber-tire tractor shovel. For proof, ask your Michigan distributor to demonstrate. You name the job . . . and the size Michigan you want to see, 1 yard, 1⅝ yard, 2¼ yard!

CLARK EQUIPMENT COMPANY
Construction Machinery Division
2473 Pipestone Road
Benton Harbor 33, Michigan
Michigan is a registered trade-mark of

CLARK® EQUIPMENT

CARDOX

(NON-EXPLOSIVE MINING METHOD)

THESE 223 MINES *Are Now Using*

EITHER CARDOX OR AIRDOX MINING METHODS

VIRGINIA

Buchanan County Coal Corporation
H. C. Harman Coal Company
Margaret Ann Coal Corporation
Jewell Ridge Coal Corporation
Panther Coal Company, Inc.
Preston Mining Company
Sunrise Coal Company
Sycamore Coal Corporation
Wallen Coal Company

WEST VIRGINIA

American Coal Company (2)
Ames Mining Company (2)
Boone County Coal Company (2)
Brule Smokeless Coal Company
Carbon Fuel Company
Chafin Coal Company
Clear Creek Coal Company
Crozer Coal and Coke Company (2)
Eastern Gas and Fuel Associates
Elk Lick Coal Company
Ethel Chilton Mines
Gay Coal and Coke Company (2)
Gay Mining Company (2)
Gulf Mining Company
Hoylman Coal Company (3)
Island Creek Coal Company (3)
Imperial Smokeless Coal Company
Jacob's Fork Pocahontas Coal Company
Johnstown Coal & Coke Company (2)
Kimberling Collieries
Lafayette Springs Coal Company
Lake Superior Coal Company
F. M. A. Leach
Lorado Coal Mining Company
L & W Coal Company (2)
Maust Coal & Coke Company
Mt. Hope Coal Company (3)
Nassau Coal Company (2)
New River Company (2)
Olga Coal Company (2)
Omar Mining Company (2)
Pardee and Curtin Lumber Company
Pecks Run Coal Company
Peerless Coal & Coke Company (2)
Peters Creek Coal Company
Pond Creek Pocahontas Coal Company (2)
Premier Pocahontas Collieries
Raine Lumber and Coal Company
Raleigh-Wyoming Mining Company (2)
Royalty Smokeless Coal Company (2)
Slab Fork Coal Company
Tioga Coal Corporation
Truax-Traer Coal Company
Weyanoke Coal and Coke Company (2)
Winding Gulf Collieries

KENTUCKY

Bell & Zoller Coal & Mining Company (2)
Begley & Conley Coal Company
Big Jim Coal Company
Black Star Coal Corporation
Carrie Lou Coal Company
Carrs Fork Coal Company
Cinderella Coal Corporation
Citation Coal Company
Deby Coal Company
W. G. Duncan Coal Company, Inc. (2)
Eastern Coal Corporation
Fed's Creek Coal Company
Field's Branch Coal Company
Fourseam Coal Corporation (2)
Inland Steel Company
Jewell Ridge Coal Corporation (2)
Kentland Elkhorn Coal Company
Kentucky Mountain Coal Company
Knott Coal Corporation
Liberty Coal Company
Lynn Coal Company (5)
Majestic Collieries Company (2)
Mary Gail Coal Company
Smith Coal Company
Stonega Coal Company
West Kentucky Coal Company (2)

TENNESSEE

Block Coal & Coke Company

CARDOX CORPORATION

ANNUAL *Roll Call*

PENNSYLVANIA

The Berwind-White Coal Mining Company
Cambria Clearfield Mining Company
Campbell Coal Company
Johnstown Coal & Coke Company
Mathies Coal Company
Marco Coal Company
Moffitt Coal Company
Morrisdale Coal Mining Company
Ontario Coal Mining Company.....(5)
Pittsburgh Coal Company
Rochester & Pittsburgh Coal Company
Sager Coal Company
Springfield Coal Corporation
Westmoreland Coal Company

OHIO

Clean Coal Company
Columbia Southern Chemical Corporation
Dindo Coal Company, Inc.
The Farm Bureau Cooperative Association Inc.
Gem Coal Company
Hanna Coal Company of Ohio
Jefferson Coal Company
Lorain Coal & Dock Company.....(2)
Merrick Coal Company
Ohio Land & Railway Company
Powhatan Mining Company
Warner Collieries Company

ILLINOIS

B & W Mining Company
Bell & Zoller Coal & Mining Company.....(3)
Belle Valley Coal Company
Blue Bird Coal Company
Blue Blaze Coal Company
Carmac Coal Company
Chicago, Wilmington & Franklin Coal Company
Eddy Coal Company
Elk Coal Company
Freeman Coal Mining Corporation
Lincoln Coal Mining
Mid-Continent Coal Corporation.....(3)
Old Ben Coal Corporation
Parton Coal Company
Peabody Coal Company
Pschirrer & Sons Coal Company.....(3)
Sahara Coal Company
Truax-Traer Coal Company
Union Colliery Company
Wilkins Coal Company

INDIANA

Enoco Collieries Company
Ingle Coal Corporation
Pandora Coal Corporation
Princeton Mining Company
R & H Mining Company
Snow Hill Coal Corporation.....(2)

OKLAHOMA

Reliance Smokeless Coal Company

COLORADO

Bear Coal Company
Black Diamond Fuel Company
Boulder Valley Coal Company
Champion Coal Company
Clark Coal Company.....(2)
Clayton Coal Company
Colowyo Coal Company
Dry Creek Coal Company
Golden Quality Coal Company.....(2)
Imperial Coal Company
Jenkins & Mathies Coal Company
Juanita Coal & Coke Company
Kerr Coal Company.....(2)
Minerals Development
Taylor Coal Company
Thompson Creek Coal & Coke Corporation
Tomahawk Coal Company
Vento Coal Company

MONTANA

Brophy Coal Company
Johnson Coal Company
Mountain State Mining Company
Nies Brothers
Northern Coal Company
Roundup Mining Company
Western Coal Company

WYOMING

Colony Coal Company
Gunn & Quealy Coal Company
Ronocco Coal Company
Storm King Coal Company

UTAH

Independent Coal & Coke Company.....(2)
Lion Coal Company

ARKANSAS

Quality Excelsior Coal Company
Smokeless Coal Company

CANADA

Amalgamated Coals, Ltd.
Century Coal Ltd.
Lethbridge Collieries, Ltd.....(2)
Midland Coal Mining Co.
Red Deer Valley Coal Company, Limited
West Canadian Collieries, Limited.....(2)

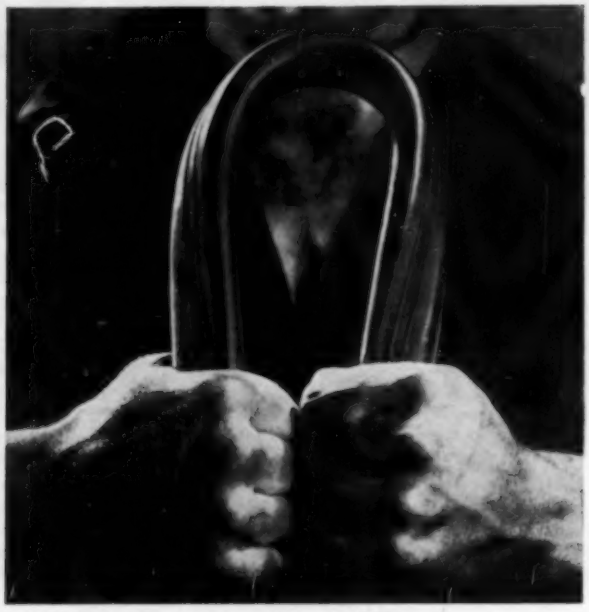
• INDICATES NUMBER OF MINES USING THE NON-EXPLOSIVE MINING METHOD

CARDOX
HARDSOCG
DRILLING EQUIPMENT
Complete line of drilling equipment designed to give you the maximum in drilling efficiency.

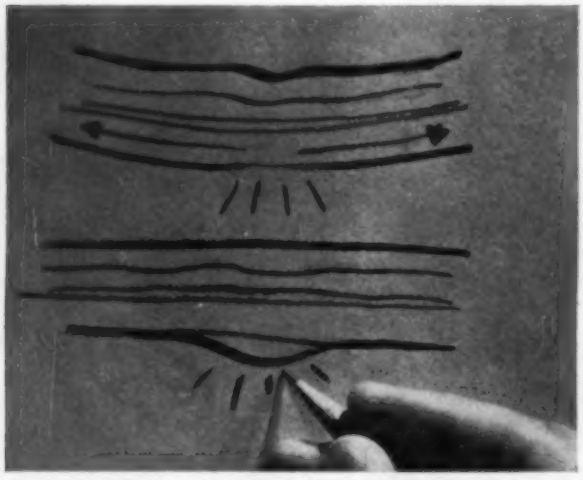
• 307 N. MICHIGAN AVE • CHICAGO 1, ILLINOIS •

Rome's shuttle car cable can't be bent the wrong way!

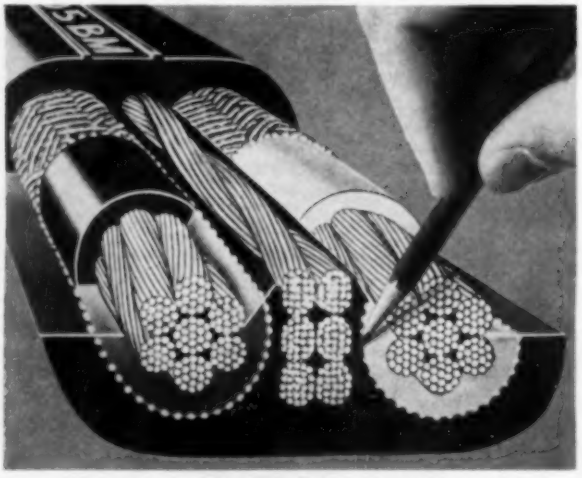
JUST *TRY* TO BEND IT THE WRONG WAY. Force a length of Rome 60 Parallel Duplex to bend along its major axis—*if you can!* You'll discover that you can't put a damaging wrong-way bend in this tough cable—and neither can obstructions on the floor of your mine.



NO DAMAGING BEND—JUST A *FLIP-OVER.* When flexed in use, Rome's Duplex flops over and bends on its minor axis. Its interlocked construction forces the change and causes a flip-over, not a breakdown. This means that the power keeps coming through, and your coal production remains high.



WHAT HAPPENS TO *OTHER* CABLES. Wrong-way bends on ordinary shuttle car cables often cause conductors to slip, causing distortion. One side of the cable may stretch, the other crimp. Result: *a weak spot.* Further flexing, tension, or twisting turns the weak spot into a breakdown. Coal production then falls behind.



WHY ROME'S DUPLEX BENDS THE RIGHT WAY. Open braid around each insulated conductor forms a crisscross tread-like surface—one that won't slip. The tough Neoprene jacket and braided conductors, meshed together, bend just one way. The interlocked construction assures the right bend, and power keeps coming through.

Send for your FREE sample! Put a two-foot sample length through this same test yourself. See how Rome 60 Parallel Duplex simply can't be bent the wrong way. Ask your nearest Rome Cable representative for your free sample—or write to Department 502-B, Rome Cable Corporation, Rome, New York.

ROME CABLE
CORPORATION

Delivery from Stock in every mining area...

ROOF BITS

Firthite "Blue Bits" for roof drilling are made in 3 styles: RDL for light uses and very soft roof rocks; RDH with extra heavy duty insert to resist gage wear for most difficult roof drilling; RDS (slotted) for faster drilling of medium to hard roofs. All are water channeled for either wet or dry work.

DRILL BITS

Firthite "Blue Bits" for rotary drilling available in 3 styles:—D with either square or hex shank for use with any standard drilling equipment; DV (illustrated) for faster and easier hand held drilling.

MACHINE BITS

Firthite "Blue Bits" for mining machines include bit design, style and grade for every need from light to rugged condition on continuous mining equipment.

FINGER BITS

Firthite "Blue Bits" for use in standard drill heads feature two-surface brazing with tips set in recesses for greater strength. Available in all popular sizes.

FIRTHITE
"BLUE BIT"
MINING TOOLS

Firth Sterling DISTRIBUTORS

Alabama	
Birmingham	A. A. Culp
Arkansas	
Little Rock	Hollis & Company
Colorado	
Denver	Union Supply Company
Illinois	
Chicago	Acme Mine Supply
DeSoto	Southwestern Illinois Supply Corp.
Indiana	
Evansville	Austin Powder Company
Kentucky	
Harlan	McComb Supply Company
Madisonville	Austin Powder Company
New Mexico	
Carlsbad	Carlsbad Supply Company
Ohio	
Cleveland	Austin Powder Company
Zanesville	Dunlap Welding & Supply
Pennsylvania	
Johnstown	Mole-Bits Company
Pittsburgh	U. S. Steel Supply Division
Scranton	Carl B. Lewis
Waynesburg	Austin Powder Company
Utah	
Salt Lake City	Rains Supply Company
West Virginia	
Logan	Guyan Machinery Company
Wheeling	Service Supply Company

Mr. Tooley says—

"Firthite 'Blue Bits' are better because Firth Sterling makes *both* steels and carbides. Tool steel shanks and Firthite Carbide inserts are perfectly matched by one manufacturing source for maximum quality."

R-3098

Firth Sterling

—INC—

GENERAL OFFICES: 3113 FORBES ST., PITTSBURGH 30, PA.

MILLS: McKEESPORT, TRAFFORD, DETROIT, HOUSTON, HARTFORD

OFFICES AND WAREHOUSES*: BIRMINGHAM CHICAGO* CLEVELAND* DAYTON DETROIT* HARTFORD* HOUSTON* LOS ANGELES* PITTSBURGH WESTFIELD, N.J

PRODUCTS OF FIRTH STERLING METALLURGY

High Speed Steels
Tool & Die Steels
Stainless Specialties
High Temperature Alloys
Sintered Tungsten Carbides
Firth Heavy Metal
Chromium Carbides
High Temperature Cermets
Zirconium

the BUCYRUS ERIE 30-B

. . . sets new performance standard in the 1-yd. class

Here's a brand new 1-yd. profit-maker for you — the Bucyrus-Erie **30-B**. Offered with either crawler or rubber-tired carrier mounting, it's readily convertible to various front ends — shovel, dragshovel, dragline, crane, or clamshell.

New . . . fast . . . quality-built, the **30-B** is just what you need in a 1-yd. machine to speed stripping and loading operations. Check the brief rundown of features given below; then request full details.

Matched to your needs

- Your choice of diesel, gasoline, or single-motor electric power. Direct or torque converter drive.
- Five easily-converted front ends — shovel, dragshovel, crane, dragline and clamshell.
- Your choice of five crawler mountings *plus* Transit Crane on rubber-tired carrier.
- Extra equipment for special jobs — independent propel, third drum unit, and cathead.

Designed to out-perform

- Easy, air control for smooth, big-output working cycles.
- Easy to service — automatic lubrication of many parts.
- Large, cool-running clutches and brakes.

Built to outlast

- Six conical hook rollers distribute loads evenly between upper and lower works to save wear.
- Five main operating clutches are alike, with parts interchangeable.
- Specially-processed steels add strength and wear resistance.
- Strong, rigid cast revolving frame withstands twisting and bending stresses, maintains machinery alignment.

199E56C-a

BUCYRUS-ERIE COMPANY
South Milwaukee, Wisconsin

BUCYRUS-ERIE COMPANY
South Milwaukee, Wisconsin

Gentlemen: Please send me details on the new 30-B.

Name _____

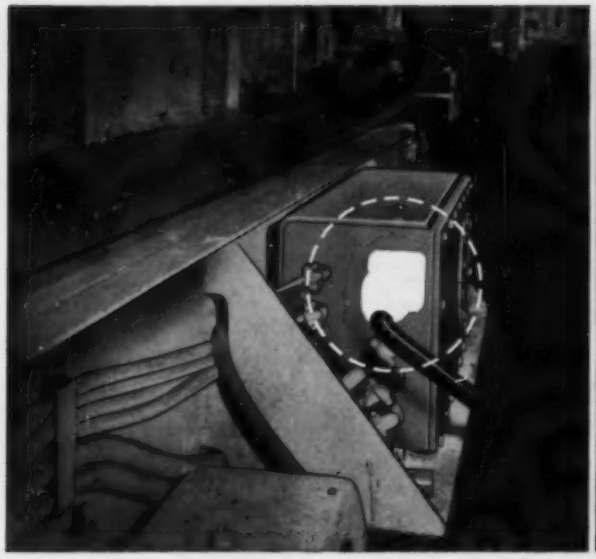
Organization _____

Address _____

City _____ State _____

199E56C-a

Send for complete facts NOW!



What Electrical Connectors would you choose ...for these installations?

Modern mining techniques allow little time for coddling men or equipment . . . so it's a safe bet your answer to the question in our headline will be based on more than just the electrical requirements of the equipment. Such important considerations as safety, efficiency, durability and maintenance cost, will influence your selection. *This is as it should be and we're glad it's true* . . . for the mining industry's constant search for the best available equipment has made JOY Electrical Connectors their preferred choice since 1928.

Why settle for less . . . when the best costs less in the long run?

JOY plugs and receptacles are specifically designed to provide long-range, maintenance-free service under the most adverse operating conditions . . . and they're available in styles and sizes to meet every mining need. Two of the currently *most popular* designs for mining installations are illustrated at right. Equipped with non-corrosive metal couplings and flame-resistant Neoprene bodies, both are moisture-tight, shatter-proof and distortion-resistant.

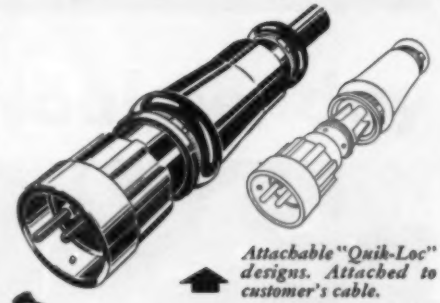
Straight Pin Bigun (SPB)—Have threaded metal couplings. Plugs are factory-vulcanized to 36" cable leads or to lengths as specified. See Bulletin B39a for complete information.

Attachable "Quik-Loc" styles—Attach quickly to customer's own cable. Newly designed couplings completely engage or disengage in ¾ turn. See Bulletin B57 for complete details.

JOY plugs and receptacles are available for both AC and DC applications. In addition, "SPB" and "Quik-Loc" connectors may be supplied with pilot control contacts for *permissible operation* when used in conjunction with JOY'S Bureau of Mines-Approved distribution centers (SCC units). Ask us for complete information, ***Joy Manufacturing Company, Electrical Products Division, 1201 Macklind Ave., St. Louis 10, Mo.*** Executive Offices: Henry W. Oliver Building, Pittsburgh, Pa.

Molded-to-cable "SPB" designs. Have threaded couplings.

Ask for Bulletin B39a.



Attachable "Quik-Loc" designs. Attached to customer's cable.

Ask for Bulletin B57.

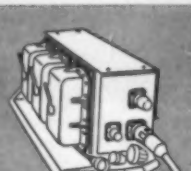
W&D CD3447

Consult a Joy Engineer

JOY

SPECIALISTS IN CREATING ELECTRICAL CONNECTORS FOR MINING AND INDUSTRY SINCE 1928

Write for information on these JOY products

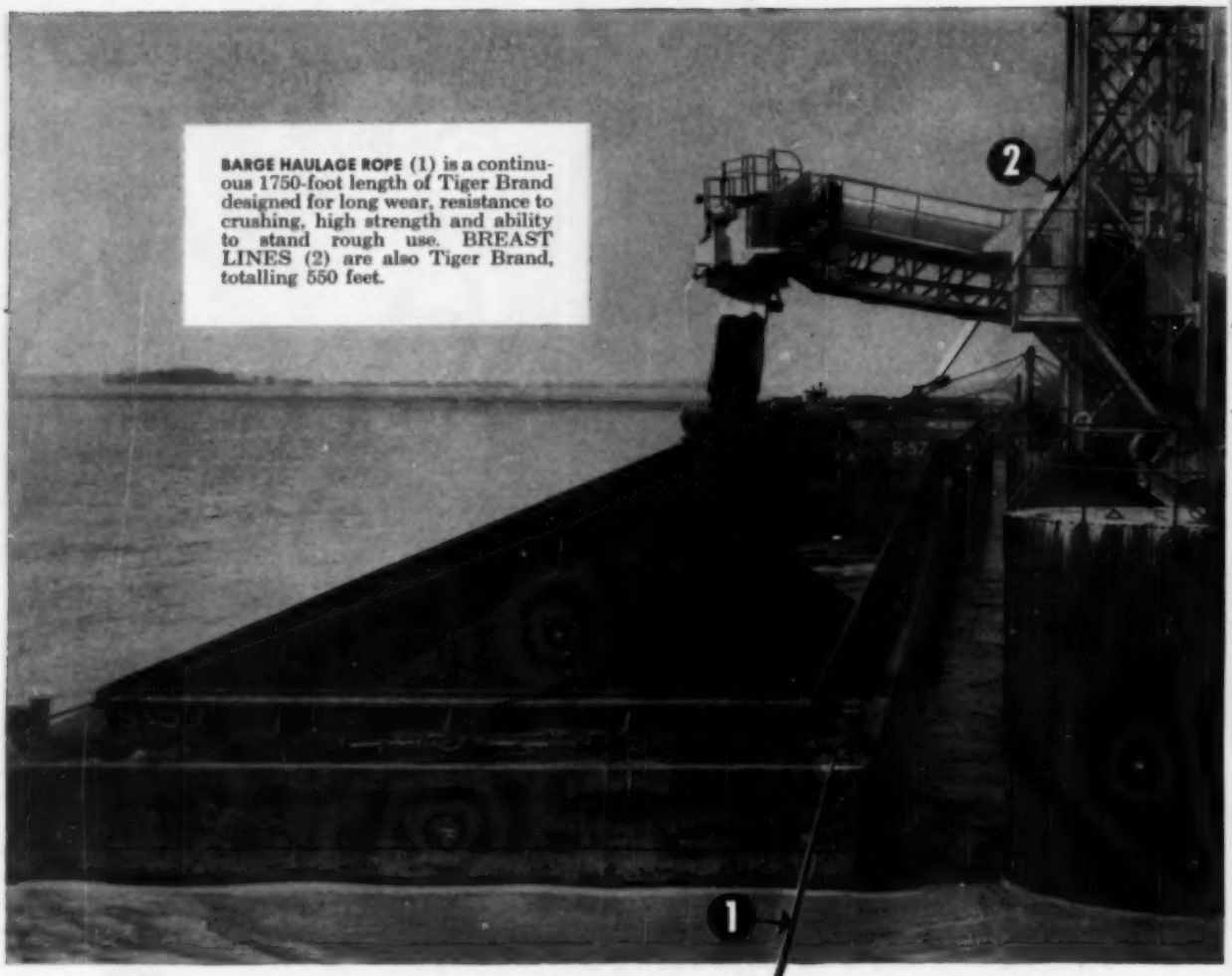


Safety Circuit Centers

Distribution Boxes

Portable Lighting

New Cable Vulcanizer



BARGE HAULAGE ROPE (1) is a continuous 1750-foot length of Tiger Brand designed for long wear, resistance to crushing, high strength and ability to stand rough use. BREAST LINES (2) are also Tiger Brand, totalling 550 feet.

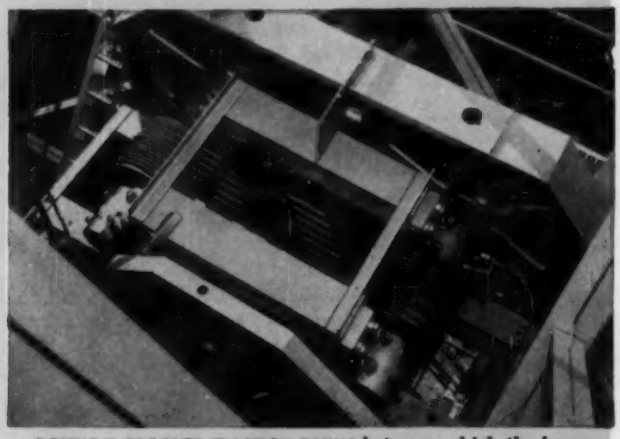
Yankeetown Dock

15-TON BOOM HOIST rigged with Tiger Brand Rope for most economical performance.

CONVEYOR uses 13 lengths of Tiger Brand Rope for belt tensioning, counterweight, boom braces, etc.

WIRE ROPE ASSEMBLY with hinged clamps for attaching barge to main haulage rope.

ROTARY CAR DUMPER is equipped with 14 lengths of Tiger Brand Rope for operating and counterweight ropes.



DOUBLE U GROOVED TRACTION DRUMS between which the barge haulage rope is reeved to form 15 parts.

loads 10,000 tons of coal per day

Unique barge haulage system operated by 1750 feet of Tiger Brand Wire Rope.

The Yankeetown Dock on the Ohio River in southern Indiana is a co-operative enterprise of the Ayrshire Collieries Corporation and the Northern Illinois Coal Corporation. It was designed to handle the output of the Wright and Victoria mines, providing barge loading of about 10,000 tons per day of processed coal.

The unique feature is the barge haulage system which uses one continuous 1750-foot length of ¾" Tiger Brand Wire Rope. This is driven from Double U Grooved Traction Drums and runs through sheaves to both extremities of the dock. From there the rope comes back unsupported to the center of the dock and is spliced to provide a continuous circuit.

The empty barges are attached to the haulage rope at the down-river end of the dock and are pulled under the conveyor chute and loaded in 1½ hours each.

The main haulage rope takes the worst beating. It is subject to immersion, chafing, and damage from crushing, in addition to bending fatigue and abrasion. For this important application, the Tiger Brand Specialist recommended the rope best fitted to give good service.

In addition to the haulage rope, the entire dock installation included fifteen other important wire rope applications on the car dumper and conveyor system. All of these were supplied from standard Tiger Brand constructions where you can always find the "Right Rope for the Job."

AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL, GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS AMERICAN TIGER BRAND WIRE ROPE

Excellay Preformed

UNITED STATES STEEL

Longer tandem life

One of 9 reasons why you'll find International Trucks cost least to own!

In any off-highway truck operation, you need a tandem and other major components built to stand up and take it, to keep costs way down.

And cost records prove* that over the years International Trucks cost *least* to own!

The reason is simply this: It is International policy to build trucks that do the job better, do it longer at lower cost than any other make—International spends more to build the truck so it costs you *least* to own.

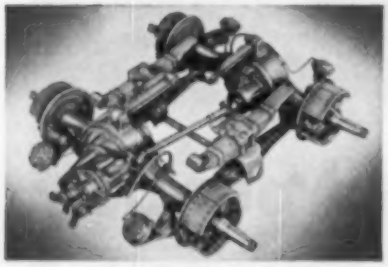
That's why there are more owners of Internationals than any other 6-wheel truck, and have been for the past 21 years!

The way to trim your trucking costs is to get together with your International Dealer, today. He's right at the other end of your phone.

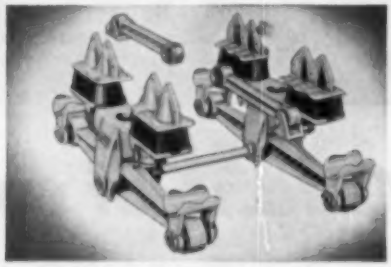
**Signed statements in our files, from fleet operators throughout the U.S., back up this statement.*

INTERNATIONAL HARVESTER COMPANY, CHICAGO

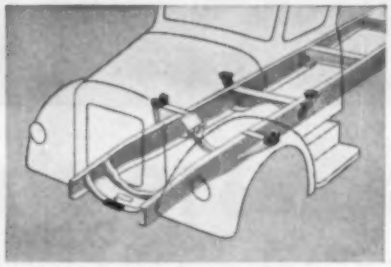
Motor Trucks • Crawler Tractors
Construction Equipment • McCormick® Farm Equipment and Farmall® Tractors



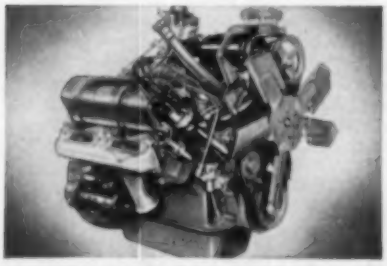
1 All International tandems give longer, more dependable life. This unit has rubber bushings at all 10 oscillating points to reduce maintenance and lengthen life. Third differential with lock transmits power smoothly and evenly to each axle.



2 Lightweight suspension with rubber load cushions provide soft, easy riding, empty and loaded. Cushions reduce truck weight and servicing. Optional aluminum walking beams, spring saddles and wheels increase payloads more than 500 pounds.

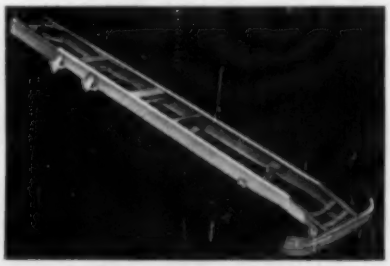


3 For cab comfort and long life. Quiet, level ride without transmitting stress to cab, fenders, hood or radiator. It's the result of wide spaced, rear shackle type mountings in an exclusive International 5-point rubber-insulated V-8 cab suspension.



4 Most powerful, most economical V-8's under any truck hood—206, 226 and 257 hp. Responsive power that gets your loads moving *fast*, keeps them moving. More miles per gallon of gas. Other gasoline, LPG and diesel engines up to 356 hp.

5 True geometric steering provides easier handling, outstanding maneuverability with short turning circles. Gears are cam and roller mounted twin lever type. Controls mounted *ahead* of the front axle. Steering wheel is comfortably positioned.

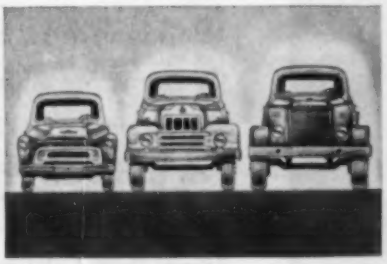


6 Steel-Flex frames combine great strength with flexibility. Heavy-duty construction plus reinforced crossmembers with husky gussets provide for proper tandem suspension. Inverted L-type reinforcements give full load-length support.

International builds six-wheel models from 22,000 lbs. GVW to 76,800 lbs. GCW in conventional and COE design. There is one practically custom built for your job. Engines range in sizes up to 1091 cu. in.—famous sixes and three great new V-8's. Complete selection of all-wheel-drive models also available to make the toughest going easy. You name the job, International has exactly the right truck for it—the truck that costs you *least* to own.

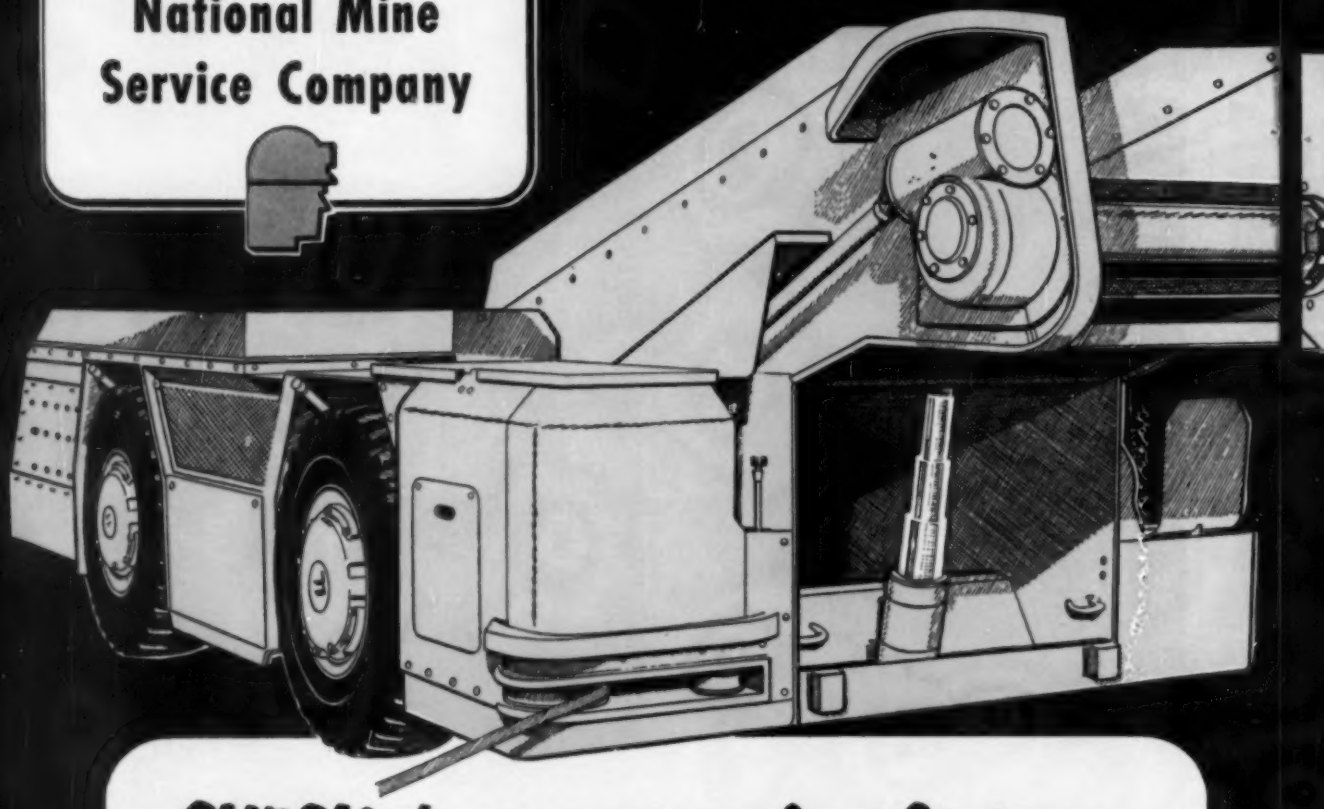
7 New "silent spin" center bearings have quiet, tapered roller bearings. Prelubricated, sealed and shielded for long, trouble-free operation. Self-aligning, wide spaced rubber mountings dampen noise and vibration, eliminate service.

8 All-wheel-drive models have the extra traction and pull needed for all tough, off-highway operations. Completely factory-built, 7,000 to 43,000 lbs. GVW. Low height with ample ground clearance. Complete selection of equipment available.



9 World's most complete line. There is an International "tailor-made" for every truck job, ½ tonners to 90,000 pounders. Choice of 4-wheel, 6-wheel and all-wheel-drive models, conventional and COE design. Every one built to cost *least* to own.

National Mine Service Company



CHECK these cost-saving features:

Single Motor—Either A. C. or D. C. . . . large capacity . . . fan cooled

Torque Converter—Provides smoother, more flexible operation and drive . . . prevents motor damage should the car stall

Heavy-Duty Interchangeable Wheel Units--Trouble-free gear and pinion type

Four-Wheel Drive and Steering—High maneuverability

Minimum of Electrical Controls—One non-reversing motor powers all drives

Constant Mesh Transmission--Three speeds forward and reverse

New Conveyor Flights—Easily detachable without breaking the chain

Full Hydraulic Pressure for Steering—Even in event of power failure

Time Saving—Boom may be raised while car is moving into position for unloading

Simplified Lubrication—Both automatic and zoned

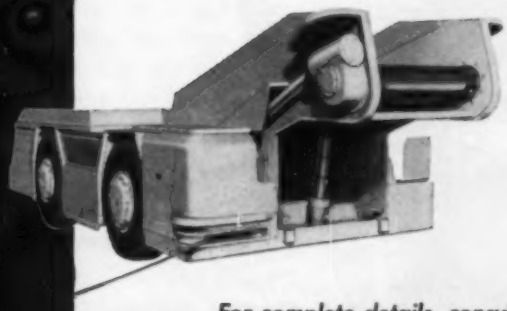
Extra Rugged Frame—Withstands hard usage and abuse

National Mine Service Company

announces its manufacture and exclusive distribution of the new

TORKAR*

A.C. or D.C. powered shuttle car



New performance and maintenance standards for shuttle car operation have been established by these patented cars in over four years of continual use and exhaustive field testing. They embody advanced design and engineering principles never before applied to shuttle car construction.

For complete details, consult your National Mine representative or write:

National Mine Service Company

564 Alcoa Building • Pittsburgh 19, Pennsylvania

All-State Division
Logan, W. Va.

Anthracite Division
Forty Fort, Pa.

Ashland Division
Ashland, Ky.

Bemeco Division
Beckley, W. Va.

Kentucky-Virginia Division
Jenkins, Ky.

Western Kentucky Division
Madisonville, Ky.

Whiteman Division
Indiana, Pa. Morgantown, W. Va.

*Trademark

U. S. Bureau of Mines Approved

Hook up your holes for *better digging*

PRIMACORD®
DETONATING FUSE

This hole is awaiting *your* orders. It is loaded and ready to "go," but it won't "listen" to stray electric currents, or even to lightning . . . it's primed with Primacord.

When it does go, it will fire in its proper sequence because it is hooked up to a Primacord trunk line which connects all holes in a fire pattern designed to insure relief of burden — produce better fragmentation, *better digging*.

THE ENSIGN - BICKFORD COMPANY
Simsbury, Connecticut • Since 1836

Primacord® Detonating Fuse, Ignitacord®, Quarrycord, Safety Fuse, Pyrotechnical Devices and Blasting Accessories

The square knot is used only above ground, to lengthen a trunk line of Plain or Reinforced Primacord, or to tie in Primacord M S Connectors. It must be drawn up tight.

Plain Primacord Trunk Line. Is used also for shallow holes — wherever resistance to abrasion and cutting is not required. Textile covered, flexible, resilient, with a tacky non-slip surface. Tensile strength 140 lbs — 1000 ft. spool weighs 17 lbs.

Plastic Wire Countered Primacord Branch Lines — Used in deep, ragged holes — and especially where metal or rigid fibre explosives containers are used — wherever strength and resistance to abrasion and cutting are essential. Armored with wire and covered with plastic material. Tensile strength 300 lbs — 1000 ft. spool weighs 33 lbs.

The knot shown is the clove hitch made in the Plain Primacord trunk line and drawn tightly around the twin branch lines.

Devoted to the Operating, Technical and Business Problems of the Coal-Mining Industry

Coal Age

JANUARY, 1957

IVAN A. GIVEN, EDITOR

'57 Preview

GOOD ENOUGH so that the problems will not be as annoying as in some past periods—this is the favorable side of the 1957 coal picture. But on the mildly unfavorable side, not so good but what some speeding up of progress on the production, preparation, safety and marketing fronts would really help. On balance, however, 1957 will be a year of solid progress.

With any kind of a break in the weather, and with the help of further increases in industrial and export tonnages, anthracite should end 1957 with another production gain. Exports and a generally high level of demand will boost bituminous up the production ladder once more to over 530 million tons. The electric utilities will again star in the consumer ranks, closely followed by steel and general industry.

Gas competition will be as tough as ever in 1957, and will be a factor in preventing the attainment of an even higher tonnage than is now forecast. Thus, even though oil is less of a thorn, coal will still have marketing problems. But the new bituminous and anthracite merchandising programs, with their emphasis on grassroots selling and engineering service, will further solidify coal's position.

Continued competitive pressure and the cost increases flowing out of wage increases put into effect in late '56 and scheduled for early '57 mean that there will be no letup in the cost-reduction drive. Whether the year will bring news of a shovel bigger than 70 yd, or of a drill making a hole larger than 12 in, remains to be seen, but the basic drive for bigger units is still a fact. Augering will reach new highs. Deep miners will put their faith in more continuous machines.

The emphasis will continue on fine coal and water clarification in 1957, as well as on drying and on plant designs reducing coal handling and labor—for example, plants with all downhill flow by screens, chutes, washers, etc. Construction activity will reach a new postwar high.

Safety gains in 1957 will be earned, as always, only by hard work. The big problems remain roof falls and transportation. Inspection will be more thorough and there will be more pressure for strict conformity with legislation, codes and rulings.

The higher degree of machine production, the added pressure for efficient planning and the always-present need for greater safety will accentuate some of coal's problems, particularly manpower. Skilled miners, mechanics, electricians and supervisors, engineers and experienced managers will be at a premium in 1957.

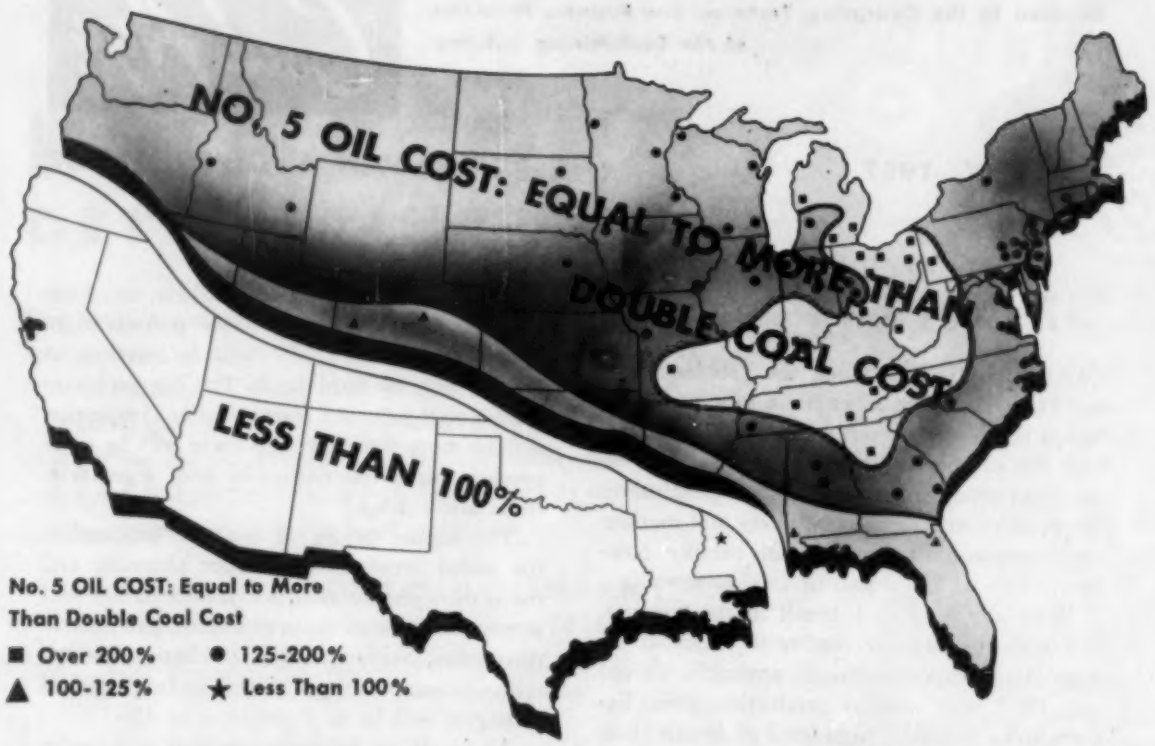
All in all, an interesting as well as a profitable and progressive year.

New in Coal Age

THOSE WHO look at the contents page in *Coal Age* already will have noted a change. Those who follow another system of checking what's in *Coal Age* are urged to turn back for an examination now. To all, the new front-of-the book setup has been developed in answer to specific requests for a quick rundown on what *Coal Age* offers each month, and for a quick summary of key developments in the industry.

"This Month in Coal Age" (pp 5, 7, and 11) digests the feature articles, giving you the gist of each one quickly and aiding you in deciding which ones you want to study closely. It also gives you the department highlights. "This Month in Coal" (p 7) and "The Coal Commentator" (p 12) present a quick summary of trends and significant developments, plus discussion of industry doings and accomplishments. The *Coal Age* editors aim to bring you more and more-useful material. The new front-of-the-book setup is aimed at helping you get more out of it more quickly.

THE NATIONAL BATTLEGROUND: How Coal

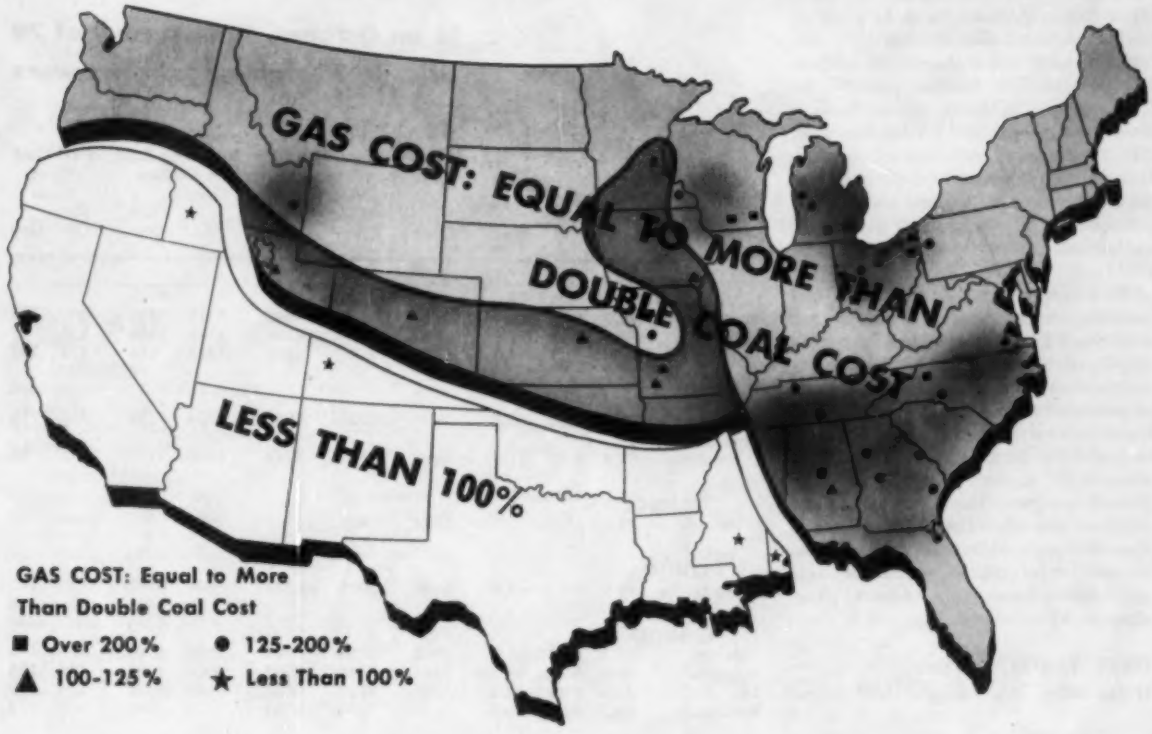

NO. 5 OIL COST: EQUAL TO MORE THAN DOUBLE COAL COST
LESS THAN 100%
No. 5 OIL COST: Equal to More Than Double Coal Cost
■ Over 200%
● 125-200%
▲ 100-125%
★ Less Than 100%

PRICES in most of the U. S. favor coal use over gas and oil in small- and medium-size industrial, commercial and some retail outlets. Sales opportunities here could rival the utility market in extent and growth. This is why . . .

Coal Mobilizes For Total Selling

Through Bituminous Coal Institute, producers aim to attack the big four trouble spots in industry selling ——inadequate engineering aid and market research, lack of coordination among existing marketing groups and relatively weak public relations and advertising. Needed most for success: 1. Total cooperation within the industry, including wholesalers and retailers, and 2. Firm support from railroads, equipment manufacturers and other allied interests.

Prices Stack Up Against Oil And Gas


GAS COST: EQUAL TO MORE THAN DOUBLE COAL COST
LESS THAN 100%
GAS COST: Equal to More Than Double Coal Cost
Over 200%
125-200%
100-125%
Less Than 100%

By W. A. RALEIGH, JR.
Assistant Editor, COAL AGE

ARMED with an industry-wide mandate, bituminous coal is mobilizing its forces in an all-out effort to:

1. Minimize the heavy losses to competitive fuels.

2. Get a bigger share of the new business that is constantly developing.

3. Convert gas- and oil-burning plants to coal.

The mandate has been given to the Bituminous Coal Institute, formed Oct. 1, 1956, as an autonomous subsidiary of the National Coal Association. **With its starting staff and organization now completed (p 60), the institute has fired up a full head of steam which promises to power a new era in coal merchandising.**

The all-out effort, already underway, aims to elevate the industry's collective market promotion activities to a level comparable to other industries through a broad, intense program of engineering aid, market research, personal service, advertising and coordination of existing group marketing agencies.

Essentially, the program will be a beefed up and expanded version of that pursued by NCA's Market Promotion Dept. During the past year or so, this effort has pioneered in developing new business and in holding or recovering many of coal's customers that might otherwise have been lost to oil and gas camps. **But the institute has these big differences in stature—not previously known in the industry—which lend to its program the aura of a new era in merchandising:**

1. **It will seek to integrate the work of existing group marketing agencies that are unable, because of limited jurisdiction or function, to fill the vacuum of service needed by the total industry.**

2. **It has the unqualified, virtually unanimous backing of producers. They are now convinced that their great progress in production must be matched by similar gains in merchandising if the full market potentials of the future are to be realized.**

For many years, far-sighted industry leaders have campaigned for better organized, harder-hitting merchandising methods which would cross beyond the bounds of individual producer lines. Their efforts have materialized in the formation of a fair number of regional and limited-functional associations such as Appalachian Coals, Inc., the American Coal Sales Assn., the Coal Producers Committee for Smoke Abatement, the National Coal Assn. in its various market promotion, public relations, research and related activities, and, more recently, American Coal Shipping, Inc.

Each of these and others have made an effective contribution to improved industry selling. But there has always been a stumbling block to an integrated merchandising service spread across the industry: Too many producers have felt they did not want to risk giving up part of their individual merchandising identity for fear that this would jeopardize their sales posi-

tion and, in time, their growth.

Overcoming this opposition was triggered by coal's resurgence in 1955-56 and the promise of a long-range period of expansion which may see tonnage jump from about 510 million in 1956 to 750 million in 1965 to 1,000 million in 1975. It was further resolved by increased realization that rising prices for gas and oil (*right*) favor a strong swing to coal use if individual company lines could be crossed and all producers would unite in the common battle against competitive fuels.

To wipe out any last vestige of opposition, an independent management consultant firm, Booz & Hamilton, was employed to make a study of the industry's merchandising needs. Their recommendations confirmed the thinking of industry leaders with this result: unqualified backing for a program aimed at implementing the Booz-Hamilton report. The Bituminous Coal Institute was then created and here is how that agency's initial program lines up—market objectives, problems, and the formula for organization and planning to do a difficult job.

FIRST TARGET: What It Is; Why It's Tough

Where coal has its toughest problem and, at the same time, one of its prime opportunities is in planning sales to the large mystery group of off-track and on-track customers falling between the strictly household consumer and the big industrial outlet. This market—including small- and medium-size industrial plants, commercial buildings, schools, apartment houses, etc.—will be the initial target of BCI's program. Sales to the group in 1955 have been estimated at 150 million tons; they might have climbed to 165 million tons in 1956; they could rival the utility market in volume and in potential for growth.

Planning sales to the "commercial market"—as the mystery group is sometimes loosely defined—is tough because this is the group where usable market data dips to its lowest point and where competition from gas and oil jumps to its highest level.

The lack of market data, on the one hand, stems from the fact that the industry has never pushed development of the commercial market on a mass basis. Individual producers have picked up their commercial customers over the years without aggressive effort; most have virtually knocked on the back door.

On the other hand, the USBM—not under pressure from the industry—has never provided any regular statistical

Box Score On

In an October, 1956 survey of 79 cities in 25 states, coal costs were

State & City	Cost/Million Btu in Cents			Equivalent Fuel Cost (14 Billion Btu Purchased per Yr) in Dollars			Savings per Year By Using Coal in Dollars		Fuel Cost % of Coal	
	Coal	#5 Oil	Gas	Coal	#5 Oil	Gas	Over #5 Oil	Over Gas	#5 Oil	Gas
ALABAMA										
Birmingham	31.3	62.8	42.0	4382	8792	5880	4410	1498	200	134
Mobile	42.0	57.1	29.8	5880	7994	4166	2114	1714*	136	71
Montgomery	40.9	71.1	42.0	5726	9554	5880	4228	154	174	103
COLORADO										
Denver	27.9	45.0	33.3	3906	6300	4662	2394	756	116	119
Grand Junction	42.8	65.0	27.8	5992	9100	3892	3108	2100*	115	65
CONNECTICUT										
Hartford	39.6	59.6	...	5544	7966	....	2422	....	144	...
FLORIDA										
Jacksonville	42.9	49.3	75.9	6006	6902	10,623	896	4617	115	177
GEORGIA										
Atlanta	33.3	69.7	48.3	4662	9758	6762	3096	2100	208	145
Augusta	38.4	52.8	48.3	5376	7392	6762	2016	1386	114	126
Macon	37.5	65.2	48.3	5250	9128	6762	3908	1512	174	128
Savannah	39.3	52.0	68.3	5502	7280	9562	1779	4060	132	173
IDAHO										
Boise	55.0	72.9	51.6	7700	10,216	7224	2516	476*	132	94
Pocatello	47.5	59.7	61.1	6650	8358	8558	1708	1908	126	129
ILLINOIS										
Bloomington	36.2	63.3	...	5068	8862	....	3794	....	174	...
Chicago	37.2	58.7	...	5208	8212	....	3004	....	157	...
Peoria	32.4	65.3	...	4536	9142	....	4606	....	209	...
Quincy	44.7	66.7	...	6258	9338	....	3080	....	149	...
Rockford	43.5	66.7	...	6090	9338	....	3248	....	153	...
INDIANA										
Elwood	47.0	86.0	67.0	6520	12,040	9380	5520	2860	183	141
Evansville	31.6	63.3	...	4424	8862	....	4438	....	...	...
Gary	35.0	62.7	...	4900	8778	....	3837	....	179	...
Hammond	33.9	63.3	...	4746	8862	....	4116	....	187	...
South Bend	43.5	66.0	...	6090	9204	....	3150	....	151	...
IOWA										
Akron	46.0	77.5	56.0	6440	10,850	7840	4410	1130	168	122
Fort Madison	40.0	75.1	40.0	5600	10,514	5600	4914	Even	187	100
Waterloo	37.3	74.0	44.0	5222	10,360	6160	5138	938	198	119
KANSAS										
Topeka	34.4	52.0	35.3	4816	7280	4942	2464	126	151	103
MARYLAND										
Baltimore	37.5	56.0	...	5250	7840	....	2590	....	149	...
Frederick	40.1	56.0	...	5610	7840	....	2230	....	139	...
MICHIGAN										
Adrain	39.0	65.7	86.0	5460	9198	12,040	3738	6580	171	220
Detroit	36.7	66.7	79.4	5138	9338	11,116	4200	5978	181	220
Grand Rapids	42.6	62.7	79.4	5964	8778	11,116	3314	5152	147	185
Muskegon	37.1	61.7	79.4	5149	8636	11,116	3487	5967	167	213
MINNESOTA										
Moorhead	67.0	83.0	...	9380	11,620	....	2240	....	124	...
Red Wing	34.0	67.0	60.0	4760	9380	8400	4620	3640	197	171
St. Paul	39.0	65.0	42.0	5460	9100	5880	3640	420	167	107

The Price Front

less than No. 5 oil in all cases; less than gas in all but six cases.

State & City	Cost/Million Btu in Cents			Equivalent Fuel Cost (14 Billion Btu Purchased per Yr) in Dollars			Saving per Year By Using Coal in Dollars Over		Fuel Cost % of Coal	
	Coal	#5 Oil	Gas	Coal	#5 Oil	Gas	#5 Oil	Over Gas	#5 Oil	Gas
MISSISSIPPI										
Jackson	44.6	58.2	36.0	6244	8148	5040	1904	1204*	130	81
MISSOURI										
Bolivar	31.0	62.5	37.5	4340	8750	5250	4410	910	201	121
Cameron	36.5	53.0	90.0	5110	7420	12,600	2310	7490	145	246
Kansas City	30.3	48.5	48.2	4242	6790	6748	2548	2506	156	161
Springfield	37.8	...	39.7	....	....	....	....	....	105	...
NEW JERSEY										
Camden	35.7	56.7	...	4998	7938	....	2940	....	159	...
Gibbsboro	40.5	56.7	...	5670	7938	....	2268	....	140	...
Trenton	36.6	56.7	...	5124	7938	....	2814	....	155	...
Vineland	35.2	56.0	...	4928	7840	....	2912	....	159	...
NEW YORK										
Syracuse	35.1	68.0	...	4914	9520	....	4606	....	194	...
New York	46.5	47.8	...	6510	6690	....	180	....	103	...
NORTH CAROLINA										
Charlotte	37.5	66.0	55.0	5250	9240	7700	4158	2450	171	146
Asheville	37.1	70.5	89.6	5194	9870	12,544	4676	7350	227	241
OHIO										
Ashland	35.7	74.0	55.9	4998	10,360	7826	5362	2826	204	156
Cleveland	30.5	73.0	66.5	4270	10,220	9310	5950	5040	238	218
Columbus	32.0	61.7	65.0	4480	8638	9100	4158	4621	193	203
Georgetown	28.6	73.3	...	4004	10,262	....	6258	....	256	...
Hamilton	31.5	66.9	67.0	4410	9360	9380	4956	4970	212	212
Lorain	27.7	73.0	66.5	3878	10,220	9310	6342	5432	263	240
Marion	40.5	73.0	55.0	5650	10,220	7700	4570	2060	180	136
Middletown	42.6	73.0	69.0	5964	10,220	9660	4256	3696	171	161
Springfield	33.4	81.0	67.0	4676	11,340	9380	6664	4704	190	200
Warren	33.8	74.2	65.5	4732	10,388	9170	5656	4438	220	194
Youngstown	22.1	74.2	66.5	3094	10,388	9310	6294	6219	335	300
PENNSYLVANIA										
Bristol	38.9	56.7	...	5440	7938	....	2494	....	149	...
Carlisle	37.5	57.4	...	5250	8036	....	2786	....	153	...
Coatsville	40.1	58.4	...	5610	8176	....	2566	....	145	...
Glen Mills	40.7	55.0	...	5698	7700	....	2002	....	135	...
Lebanon	41.1	56.7	...	5754	7938	....	2174	....	138	...
New Castle	33.5	76.6	60.1	4690	10,724	8414	6034	3724	224	154
Philadelphia	39.2	56.0	...	5488	7840	....	2352	....	140	...
SOUTH DAKOTA										
Aberdeen	46.0	65.0	...	6440	9100	....	2660	....	142	...
TENNESSEE										
Chattanooga	32.8	75.0	49.1	4480	10,500	6874	6020	2394	228	150
Knoxville	33.6	77.9	59.1	4704	10,906	8274	6202	3570	233	176
Memphis	35.0	52.3	29.0	4900	7322	4060	2422	840*	149	83
Nashville	31.6	74.0	63.3	4424	10,360	8862	5936	4438	234	198
UTAH										
Salt Lake	31.3	45.5	36.0	4382	6370	5040	1990	658	144	114
VIRGINIA										
Richmond	39.0	68.0	74.0	5460	9520	10,360	4060	4900	174	190
WISCONSIN										
Madison	39.0	77.0	90.0	5460	10,780	12,600	5320	7200	197	235
Marinette	46.0	73.0	...	6440	10,220	....	3780	....	159	...
Milwaukee	38.8	73.9	1000	5432	10,346	14,000	4914	8362	190	254
Superior	42.0	70.0	...	5880	9800	....	3920	....	161	...

* Indicates less than coal.

Blanks, where occurring, mean data was not available because fuel is not generally used for schools, hospitals and other large space heating installations.

Data compiled by the Bituminous Coal Institute.

breakdown of shipments to the commercial market now lumped, for the most part, in the polyglot category of "other industrials" but also including a sizable portion of retail sales.

As a result of these two factors, the individual producer's knowledge of his commercial market is largely confined to his own list of customers which more or less fit into the category; he has no way of knowing the components of the group for the industry at large; and he has little or no basis for setting up a comprehensive campaign to expand sales to it.

Difficulties in developing the commercial market are further complicated by the entrenchment here of gas and oil. This is not due, in most cases, to superior burning equipment or to any greater merits these fuels offer in price and Btu value; instead it is due almost entirely to the failure of coal to defend and promote its interests. **While coal has slept, oil and gas have been having the proverbial "field day" by coordinating aggressive, well planned, well executed and well financed promotion and advertising programs with the work of highly trained sales and engineering staffs.**

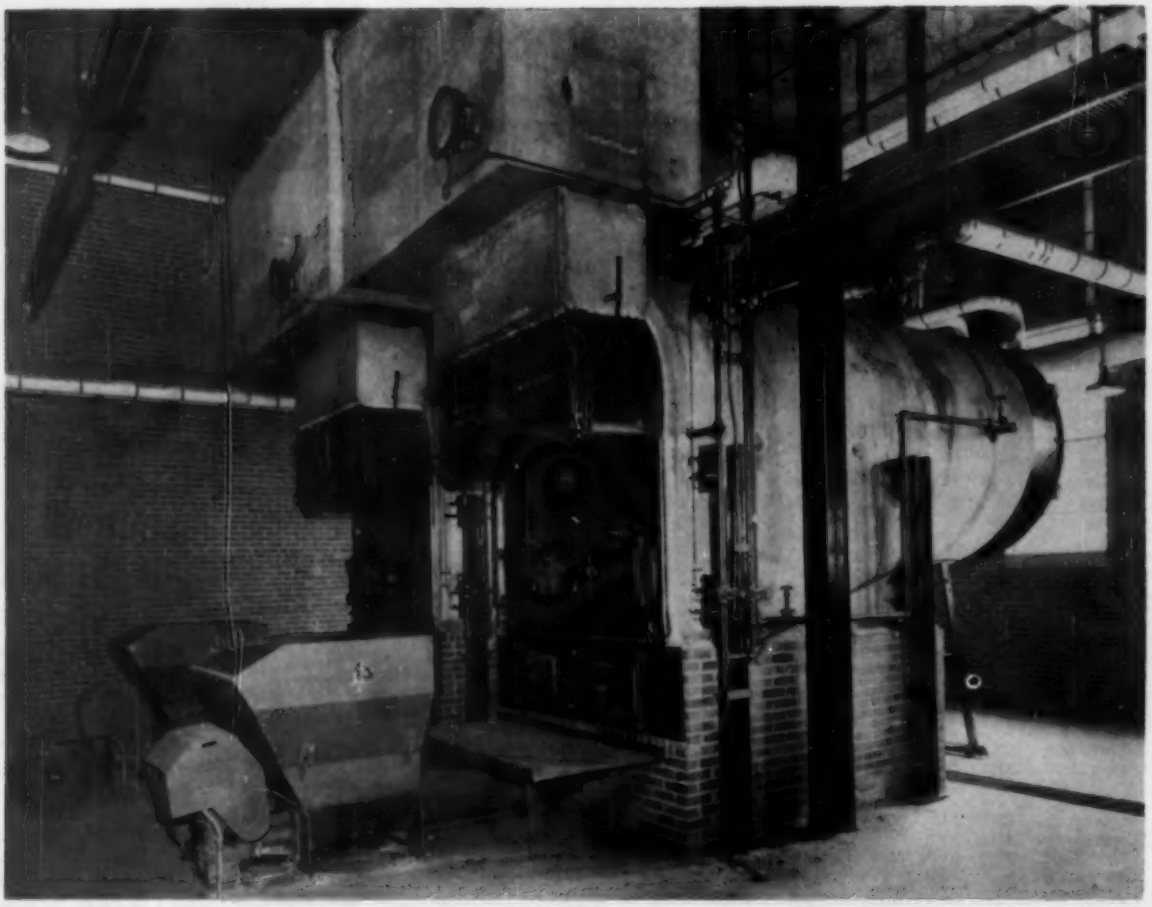
CASE HISTORIES: Coal vs. Oil & Gas

During the past year, NCA's regional market promotion managers (now BCI district engineers) reported an increasing number of cases such as the following, which leave little doubt (1) that competitive fuels have often oversold their case, and (2) that the surface has only been scratched in selling the advantages of coal and modern coal-burning equipment:

From Chattanooga, Tenn., Regional Manager Leonard Bradley reported that a dye works burned up its 50-yr old coal-fired boiler due to failure of its low-water control. As the fastest means of replacing the steam supply, a packaged gas-fired unit was installed. The dye works had used 600 tons of coal per year at a cost of $4,200. Gas costs for the FIRST SIX MONTHS amounted to $4,300. Subsequently, the manager of the company made plans to convert back to coal.

Another comparison of gas vs. coal in the same area concerned the heating costs of three elementary schools. Their experience indicated that gas costs ran about 2½ times the cost of coal, and that this cost was 50% above the cost estimated by the gas company salesman BEFORE the installations were made.

From Charlotte, N. C., Glenn Arter cited a case where a 25,000 ton-per-



MAXIMUM HEAT for minimum cost, durability and the ease of bin-to-stoker transfer feature boiler installations at a large school in Chattanooga, Tenn. (left) and at an industrial plant in Cleveland, Ohio (right). In the school

The New Look In Modern

yr textile plant expressed complete satisfaction with coal which it expected to use for a great number of years to come. The cause of satisfaction: a detailed cost study showing that coal was 8 to 10c cheaper per million Btu than gas at 42c per million Btu.

An official of another textile plant in the same area said that he would much prefer firing coal than gas without an attendant because of the unquestioned safety in the use of coal. The plant had considered oil as an alternate fuel, but studies completely disqualified it because of higher cost.

From Westerville, Ohio, V. V. Lehtoranto reported contacting a school superintendent who was adamant on the use of oil in a new school. The architect had also advised the school board that oil was his choice. In a series of visits, Mr. Lehtoranto undertook the job of telling the architect and school board of the advantages of coal and presenting possible design layouts for coal-fired heating plants. Subsequently, the superintendent advised that the school board had approved the installation of a stoker-fired hot-water heating system for the new high school building.

From Evanston, Ill., Marc Bluth cited the case of a large office building in downtown Chicago, which had converted several years ago to an oil installation requiring 200,000 gal of heavy oil per year. In spite of the oil representative's claims, no reduction in boiler room labor resulted after conversion to oil. A man had to be in attendance almost constantly on three shifts, especially during the cold weather. The manager offered to provide proof to anyone that an oil-fired plant, of the size for which he is responsible, needs as much labor as coal.

From Salt Lake City, Utah, Harold Mays reported that a poor boiler room design in a Dillon, Mont. school necessitated moving coal by hand some 30 ft from the bin to the stoker hoppers. In addition, these hoppers were placed high up and it took a good deal of manual effort and dexterity to fill them. Because of excessive manual attention, the school board was considering conversion to oil. Mr. Mays showed the school board how coal handling can be mechanized. A screw-type conveyor and bin controls were installed making the plant almost completely automatic. The school board is now well pleased with their heating plant and modern coal heat.

From St. Paul, Minn.—A large firm

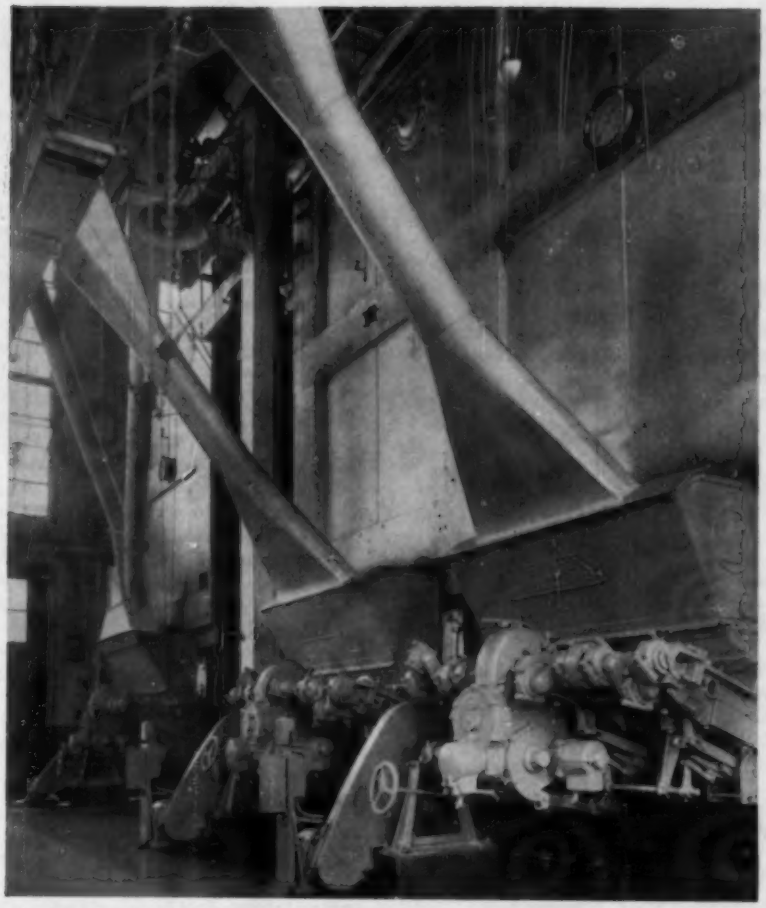


photo note the electric monorail above the stokers. This monorail, along with an electric hoist at the bin, handles bin-to-stoker transfer.

Coal-Burning Equipment

of consulting engineers proposed self-contained oil-fired 250 hp water-tube boilers for modernizing the boiler plant of a large paper company in Wisconsin. Hearing of the proposal, Jay Blank arranged a meeting with the plant's chief engineer to present the case for coal and modern coal-burning equipment. Result: management made plans to install new integral-furnace boilers with vibrating-grate stokers. BCI action here thus saved an outlet for 13,000 tons of coal per year.

The above are, by no means, isolated case histories. Many more are on record in BCI's Washington office files or have been published in sales brochures, such as "Automatic Coal Heat for the Nation's Schools," and "Modernized Coal Serves Today's Hospitals." New cases, coming in steadily from the field staff, are reported in BCI's industry bulletin, "News Notes."

HOW TO DO THE JOB: BCI's 4-Pronged Attack

To solve competitive problems and develop the full potentials of the commercial market, BCI aims specifically to:

1. Give engineering assistance to existing and potential coal users, architects, consulting engineers, etc., through field representatives.

2. Develop sound engineering data, designs, recommendations and general information on modern coal-burning installations.

3. Undertake market research that will define who are coal's existing and potential customers, and where they are.

4. Expand advertising and public relations efforts to foster public acceptance of coal.

BCI's budget for 1957 has not been disclosed but official comment indicated that it was adequate for the first year of operation. Plans call for upping the 1957 budget by 50% in 1958 and by 100% in 1959. By the end of 1957, it is hoped that a substantial portion of the agency's budget subscription will go beyond NCA membership and include other interested groups—retailers, wholesalers, railroads, equipment manufacturers, etc. Enthusiasm to join up is reported high among these groups. The American Retail Coal Assn., for one, has already recommended that its membership "unite with producers in those portions of the (BCI) program that will further the retail cause of coal."

ENGINEERING AID: Key To Personal Service

The engineering aid part of BCI's program stresses personal service. Under the guidance of managing director Carroll Hardy, a field staff of 12 district engineers (soon to be expanded to 15) is now engaged in contacting consulting engineers, plant owners, school boards, etc., to give them general information on modern coal-burning plants, or to work with them on specific projects. Their calls cover the gamut of sales opportunities: new construction, plants now using coal, and plants now using competitive fuels.

In all cases, the district engineer makes a special point of presenting a comparative analysis of oil, gas and coal costs. Where new construction is involved, experience has shown the importance of getting to the architect and/or consulting engineer during the early stages of planning. Where coal is now used, the main effort is to show how existing installations can be upgraded and modernized since it is well known that a dissatisfied customer is the first to think of using another fuel. Where a case involves competitive fuels, if the prospect cannot be sold now on converting to coal, the pitch is to sell him on investing in a standard-size boiler instead of in the oil- or gas-fired packaged type. In this way, the prospect is told that he will have the advantage of being able to convert to coal at some future date if the price of oil or gas should rise to prohibitive highs.

During one week in October, 1956, the field staff made 219 calls. Of these, concerned conversions from oil or gas 101 involved new construction, 44

Men Behind the BCI

ALL MEN connected with the merchandising of coal will be, in the final analysis, the "Men Behind the BCI." More closely connected than most will be the men serving on the district advisory committees. But those immediately charged with directing BCI operations and carrying out its program are:

OFFICERS

President—**R. L. Ireland,** chairman, Executive Committee, Pgh. Consol Co.
Executive vice president—**M. L. Patton,** vice president, Truax-Traer Co.
Vice president—**Tom Pickett,** executive vice president, National Coal Association.
Treasurer—**John L. Kemmerer, Jr.**—vice president, Wise Coal & Coke Co.
Secretary and assistant treasurer—**Carl Crowe,** same, NCA.
General counsel—**Robert E. Lee Hall,** same, NCA.
Managing director, **Carroll F. Hardy**

ENGINEERING DEVELOPMENT

Manager—**Charles H. Marks**

DIRECTORS

B. R. Gebhart, vice president, Freeman Coal Mining Corp.
T. L. Kelce, executive vice president, Southern Coal Co.
Ralph H. Knode, chairman of the board, Stonega Coke & Coal Co.
M. L. Patton, vice president, Truax-Traer Co.
R. L. Ireland, chairman executive committee, Pittsburgh Consolidation Coal Co.
John L. Kemmerer, Jr., vice president, Wise Coal & Coke Co.
George E. Owen, president, Imperial Coal Corp.
R. E. Salvati, president, Island Creek Coal Co.
Charles R. Griffith, president, Southern Coal & Coke Co.
Harry Junod, Pickands, Mather and Co.
W. S. Webster, vice president & general manager, Walter Bledsoe and Co.
Harold D. Wright, chairman of the board, Republic Coal & Coke Co.

DISTRICT ENGINEERS

Dist. No. 1—**William D. Robinson,** Maple Rd., Pines Lake, Paterson, N. J.
Dist. No. 2—**Joseph W. Mullan,** 222 Sylvan Ave., Gloucester, N. J.
Dist. No. 3—**Glenn A. Arter,** 420 Allendale Place, Charlotte, N. C.
Dist. No. 4—**Victor V. Lehtoranto,** 178 N. Vine St., Westerville, Ohio
Dist. No. 5—**J. K. Goodwin,** 15717 Fielding St., Detroit, Mich.
Dist. No. 6—**John P. Reese,** 524 Merchants Bank Bldg., Indianapolis, Ind.
Dist. No. 7—**Leonard F. Bradley,** 3824 Montview Dr., Chattanooga, Tenn.
Dist. No. 8—**J. Arthur Blank,** 1543 Larpenteur Ave., St. Paul, Minn.
Dist. No. 9—**Marc G. Bluth,** 2245 Wesley Ave., Evanston, Ill.
Dist. No. 10—**Chester B. Buttgen,** 4424 N. Timber Circle, Peoria, Ill.
Dist. No. 11—**Howard J. Scott,** 708 E. 98th St., Kansas City, Mo.
Dist. No. 12—**Harold R. Mays,** 163 E. Fourth South, Salt Lake City, Utah

THE HEADQUARTERS OFFICE: 802 Southern Bldg., Washington, D. C.

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to coal or threatened conversions from coal to oil or gas, 14 pertained to service (stoker adjustment, etc.) and 60 to information. Classified by job status, the same 219 calls involved visits to 80 administrative or plant officials, 95 consulting engineers and architects, 14 equipment sales personnel and 30 coal men (retailers, fuel engineers, shipper's representatives, etc.).

Assuming the present field staff averages about 220 calls per week in a 50-week year, it will operate at an annual rate of 11,000 calls. This is truly impressive for a nucleus force of 12 men. **But, undoubtedly, the nucleus force will have to be expanded considerably if BCI field activities are to cover the hundreds of thousands of customers, prospects and other contacts related to developing the commercial market across the Nation.**

BCI officials are not unaware of the need for staff expansion. In fact, as previously noted, the recruitment agenda calls for increasing the district engineer force from 12 to 15 early in 1957. By the end of 1957, plans call for adding 10 more engineers, bringing the total field force to 25. As district divisions prove unwieldy or require specialized treatment, other staff additions will be considered.

With or without increases in the field force, the burden of personal service would be too great for the district engineers to carry alone. In recognition of this fact, BCI is organizing district advisory committees to aid the district engineers in developing their campaigns. These committees consist of men representing producers, distributors, retailers, railroads, equipment manufacturers, etc., who are in key positions to acquaint district engineers with the centers of influence in their areas, to route them to the proper people, and to inform them about local consumer habits and attitudes.

To back up the district engineers on the all-important "grass-roots" level, counterparts of the district committees are being set up in many localities. These sub-committees, or panels of "Minute Men," with a member from the district committee as chairman, will play a vital role in organizing local assistance.

ENGINEERING DATA: Tools For Sales Presentations

In the second part of its program, BCI will act as a clearing house to gather and prepare engineering data for use by field men in making sales presentations. Part of this material will come from contacts of the engineers in the field. As they work on an individual problem, they will report to the Washington office. Other data will be developed through contacts with equipment companies, consulting engineers and other specialists in fuel and heating problems.

All data and case histories will be fed back to the field staff and will be otherwise disseminated through direct mail, contacts with various professional groups, technical papers at engineering conventions, articles in the trade press, etc. **Since much of this information is now available in somewhat scattered form, the problem here involves both consolidating available data and preparing new information.**

MARKET RESEARCH: Basis For Total Sales Coverage

Knowing who the customers and prospects are, and where they are, is basic to any sales campaign. The lack of market data has been, and still is, a weak spot in coal's merchandising structure — especially, as previously noted, in the commercial market. **At the present time, BCI will rely heavily on (1) the Dodge reporting service to**

develop prospects in new construction, and (2) on the coal trade and allied businesses for leads where engineering aid may spell the difference in whether or not a plant stays with coal or converts to coal from competitive fuel use. But the best results will come only when district engineers have detailed market data to guide them in exploiting the full potentials of their areas.

Towards this objective, NCA and the USBM have blueprinted a new system for reporting shipments, which they hope to have in effect by July, 1957. An initial appropriation of $75,000 has been submitted to the Interior Department and all signs point to its approval.

Under the new system, producers will make monthly reports to the USBM on the origin and destination of their shipments to regional and state marketing areas by major market categories—electric utility, metallurgical, and other industrial. Total tonnage to Canada and overseas will also be included. On domestic shipments, where lots are sent to an agent for distribution, the agent will report the distribution data needed to fill in spots left blank by the producer. Distribution data by marketing area and end-use has not been available before on a regular monthly reporting basis except for several years during World War II.

Officials close to the project hope that the reporting of distribution data on a broad basis will lead to further breakdowns in the miscellaneous "other industrials" category which includes most of the commercial market. Such breakdowns would give data on the extent of coal's markets in schools, hospitals, greenhouses, small and medium-size industrial plants, commercial buildings, shopping centers, etc. The industry is generally agreed on the need of detailed breakdowns with the understanding, of course, as in the case of major market-category shipments, that the identities of shippers and consumers will be held confidential.

PUBLIC RELATIONS: Road To Customer Good Will

As the fourth part of its program, BCI will attack another weak spot in coal's merchandising structure: public relations and advertising. **In recent years there has been an increasing need for gearing up these activities because of the widespread ignorance of the advantages of coal and modern coal-burning equipment.** Meanwhile, oil and gas—backed up by well executed and well financed advertising and public relations programs—have capitalized on this ignorance. The result: competitive fuels have been able to sell many of coal's rightful customers on claims of the economy of their product and of the relative inefficiency of coal-burning equipment.

A large part of coal's lethargy in public relations and advertising is due to a general lack of understanding of their functions in merchandising. Basically, they set the stage for point-of-contact selling by attracting attention to, arousing curiosity about, and creating a preference for a product, company or industry. For many years now, the role of public relations and advertising in modern selling has been generally accepted. **The time is here for coal to get on the bandwagon.**

NCA's Public Relations Dept. has made a fine start in selling the story of coal and modern coal-burning equipment through national advertising, motion pictures, radio, television, educational leaflets, fact books, exhibits, press information, speeches and related activities. Essentially, getting on the bandwagon means stepping up and tailoring these efforts to meet the needs of BCI's merchandising program. A notable example is the present series of national ads, "Burning Coal the Modern Way." **A stepping up in BCI's public relations and advertising efforts might also include:**

1. **Setting up a coal utilization convention to bring together coal producers, distributors and retailers, equipment manufacturers, consulting engineers, purchasing engineers, etc.** This could be done as a national convention, a series of regional conventions, or as a traveling train show.

2. **Preparing a special equipment brochure file (like Sweet's industrial-type file) for BCI district engineers and for their distribution to existing and potential coal users, architects, consultants and railroad traffic men.**

3. **Organizing a speaker's program through which BCI staff members could tell their story to groups of purchasing agents, consulting engineers, architects and others related to the coal trade.**

4. **Writing articles and booklets on modern boilers, coal-handling controls and equipment, storage, etc., for distribution to coal salesmen, customers, prospects and key contacts.** A notable example is a 12-p booklet, "Coal and Ash Storage and Handling," recently published by Bituminous Coal Research, Inc., to answer questions and give design data on coal and ash handling for plants using up to 5,000 tons of coal annually.

5. **Arranging contests for the model coal-burning installation of the year.** This would result in good publicity and prestige, as well as provide material for distribution on typical coal-installation designs and layouts.

SUCCESS NEED: Total Industry Backing Plus

BCI has got off to a fine start. It has all the obvious ingredients for success: a well-trained experienced staff, a well-conceived program, adequate initial financing, a growth pyschology and the unqualified backing of its immediate membership. **However, don't make the mistake of thinking that overcoming the long-standing trouble spots in coal's merchandising structure will be automatic or quick now that BCI has been formed. Because industry-wide selling is new to coal, on the one hand, and long-practiced by competitive fuels, on the other, the road ahead will be tough. For its ultimate success, BCI will need sustained, full cooperation not only from within the total industry—producing companies, distributors, brokers, retailers and existing group marketing agencies, but also from "outside" or fringe interests such as equipment manufacturers, railroads and consultants.**

To fulfill this need, sales executives and field men with producing companies, distributors and existing group marketing and related agencies must:

1. **Get in the habit of thinking of BCI as an integral part of the industry's total merchandising effort.**

2. **Make a point of funneling leads to BCI where engineering aid and promotion are critical to holding or developing a customer.** All too frequently in the past, the pursuit of "doubtful" customers by shippers' representatives has not been considered productive sales effort. The fallacy of this attitude is now quite generally recognized.

3. **Educate outside or fringe groups —railroads, equipment manufacturers, consultants, etc.—on the objectives of the BCI program.** The appeal here is to the self-interest of these groups in developing new business. BCI experience so far shows that such groups can be sold on cooperation and mainly for this reason: The industry can now cite proof of the advantages of coal and modern coal-burning equipment through an increasing number of case histories.

Wheels the Original

Though preceded by baskets and sleds, wheeled cars were the basis on which face transportation was built, even though service to the face, and particularly loading machines, was necessarily intermittent. High loader capacities, however, were sufficient to offset much of this handicap.

Modern Modification

Greater flexibility features the shuttle car, which is not tied to track, and consequently is more able to meet the needs of modern loading units, though its handicap of intermittency began to show up when used behind low-capacity continuous miners.

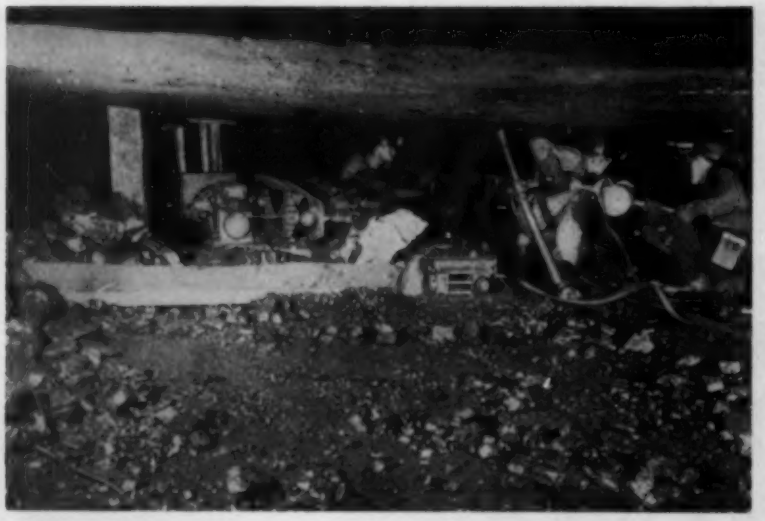
Newest and Continuous—Though the conveyor was early recognized as a logical face-haulage unit, its use behind machines awaited development of a connecting link and means of achieving rapid extension, as in this new extensible belt serving a continuous miner.

Evolution and Revolution In Face Transportation

How coal has proceeded toward the goals of continuity and capacity in haulage at the face . . . What it is doing with both old and new types of units . . . Why continuity and capacity are more necessary than ever.

TIME WAS when miners solved their transportation problem by putting the coal into a basket and handing it to a woman or child to carry out. The next major step was pulling the basket with a rope. Conservation of effort even then was a goal in mining, so the pulling job was handed over to a dog, pony, horse or mule in about that order, and the job was eased by putting wheels on the container, making it into a car.

The roadbed also was early discovered to be a significant factor in transportation performance, and with



Chain Conveyors first went into coal mining in the U. S. in 1902 and were widely used in the 30's and 40's on hand-loaded faces.

Shaker Conveyors made the first U. S. mine in 1922. Development of the duckbill in 1926 permitted converting them into loaders.

wheeled vehicles or cars as the most practicable transporting medium the next logical step was to use rails and ties to get a smoother, more-reliable and higher-speed transport system.

Powered operation, using first the steam engine developed by Watt, was the next step, since the early miners soon discovered, in transportation at least, that the input in food and other maintenance was not a particularly good match for the output in tons hauled. Mechanical power was less costly basically and in addition and within limits the mechanical unit could handle much larger chunks of tonnage at a time and stay on the job indefinitely without fatigue and only infrequent stops for maintenance, another name for recuperation from wear and tear.

Steam obviously was unsatisfactory when mines began to grow to any size, and thus the industry began to cast about for other power sources. Compressed air was one. Then, late in the 19th Century, the DC motor was brought far enough along to serve as a practical traction unit, and coal passed from primarily animal to primarily power haulage, though animals remained in the mines in large numbers until well into the 20th Century—primarily for face transportation.

The late 30's saw the start of an era in which the wheeled haulage unit was divorced from track by putting it on rubber tires and providing it with its own individual drive, with major benefits because of increased flexibility and other advantages.

The conveyor came into the picture in the United States in 1902 for the chain type, in 1922 for the shaker and in 1925 for the belt. First the chain and next the shaker took hold and began to go great guns, especially in the late 30's and early and middle 40's. The belt, however, lagged in face service because it was not feasible to sectionalize it and early attempts at rapid extension met with failure. Recent solution of these problems, however, has made the belt a prime contender for face-transportation honors.

Whether consciously or not, the goal of those concerned with haulage since the beginning of mining has been capacity, continuity and minimum operating labor. Continuity need not necessarily be complete, but it should be near enough so that the transportation system does not handicap loading or mining at the face. On this basis, how do the various means of transport available today stack up?

Mine Cars and Locomotives

Non-continuous but providing a reasonably close approach to continuity with proper equipment and proper layout. Track essential and flexibility not as easy to attain. Some of the higher tonnage records with loaders have been attained with track layouts, however.

Use of mine cars at the face necessarily means that loading is a batch operation. Necessarily, also, track must be laid for every pound of coal mined, not only representing some cost but also imposing a degree of inflexibility in the mining and transportation systems.

With hand loading on the tonnage or contract system, especially when, as in the old days, there was no penalty on working more than a certain number of hours, the batch system involved in the use of mine cars was not a particular handicap, especially where the miners pushed their own cars. But where the company had the responsibility for getting the cars to and from the face, and there was pressure for maximum production, it was found that the bigger the car the greater the efficiency.

This relationship between car size and productivity of the loading unit was brought sharply into focus with the advent of the first loading machine. Back in 1910, for example, car size and car service were cited as major problems in machine-loading performance. As time wore on, at-

tempts to get around the disadvantages of batch transportation at the face took two major directions: (1) bigger cars, and (2) maintenance of changing points closer to the face.

Basically, however, the mine-car transportation system, and its successor, the shuttle-car system, worked as well as it did only because the loading machine had enough capacity to turn out a respectable tonnage even though it actually moved coal less than 40% of the shift.

Small shafts presented a special problem, solved by using big cars at the face and installing transfer stations for reloading into the smaller cars for hoisting. This was a development of the year 1937, in Illinois.

Shuttle Cars

Like mine cars, noncontinuous but still providing a close approach when properly operated. Cost of operators and other expenses offset the savings in track, while greater flexibility is a decided advantage.

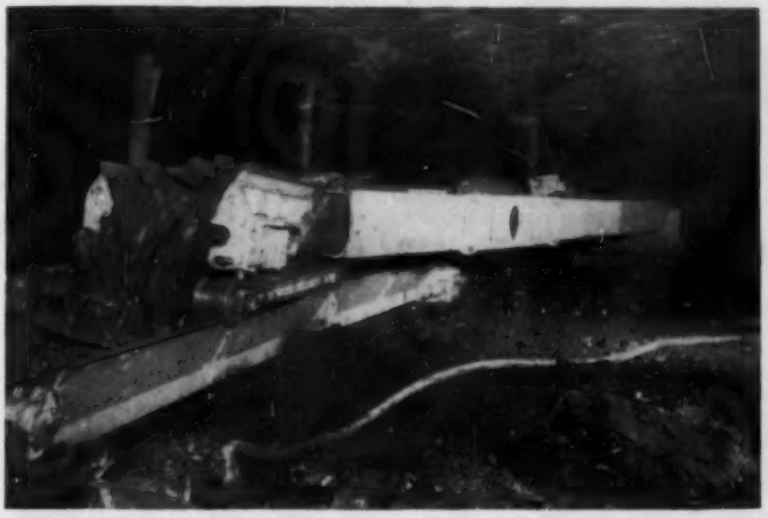
Use of shuttle cars still means a batch operation but the flexibility inherent in operation on rubber has been an asset since development of the shuttle car's immediate predecessor—the battery tractor-trailer unit—in 1938. Also, as with mine cars, the high capacity of loading machines still means good or even excellent tonnages in spite of intermittent service. As with mine cars, the secret of high performance with shuttle cars is the biggest possible unit, two or more units per machine, and passing points as close to the loading point as possible.

The battery was the first source of power, but was soon almost completely superseded by the cable reel. Whether battery or reel, the drive was the conventional DC traction motor. A new design interposes a torque converter and gear box between the motor and the axles. Consequently AC motors or, even, diesel engines, can be used as conveniently as DC. Also, a low-inertia armature can be employed in either type of motor, meaning lower-cost motor construction as well as less electrical stress in the cables. Also, the control is much smaller and simpler.

Conveyors

Basically providing complete continuity in face transportation. Moving and extension are offsetting disadvantages of conventional units with extension difficulties until recently preventing use of belts in the face area. Bridge conveyor, providing positive connection between loader and room unit, responsible for comeback of chain-type unit; bridge also an essential part of the extensible belt.

Problem With Loaders—Conveyors were first used behind loaders in 1935 but jockeying required militated against wide use.



Solution For Loaders—Development of the bridge conveyor in 1950 provided solid connection and sparked major conveyor comeback.

The element of continuous availability is of sufficient weight to make the conveyor a major unit even with hand loading. Consequently, until the machine largely displaced the hand loader, the conveyor was one of the most popular of the "mechanization" units, far outselling loaders in most of the late 30's and early 40's. It still is an effective unit in the very thin seams for which loading or mining units are not yet available.

Extension to follow the face and movement from place to place were among the conveyor's disadvantages when used with hand loading. When attempts were made to use conveyors behind loading machines, still another difficulty showed up: jockeying to keep the rear conveyor of the loader over the room conveyor. This jockeying was enough of a handicap to limit conveyor-loading machine setups to a bare minimum. Development of the bridge conveyor in 1950 eliminated the need for jockeying by providing a solid, continuous connection between loader conveyor and room conveyor. In addition, it reduced the number of interruptions to extend the room conveyor to one-half or one-third the number previously necessary. Highly impressive increases in tons per man

High Tonnages From Continuous Miners reflect the ability of extensible belts to provide continuous high-capacity transportation plus rapid extension to follow the progress of the mining unit. Idlers in this unit are suspended from wire ropes.

are among the results—in the order of one-fifth to one-third or more. As an example, one mine in 34-in coal was getting 21.14 tons per section man in 1954, while the increase at the property installing the first unit was more than double in the trial period. Further evidence of the value of the bridge conveyor is found in the fact that it has been incorporated in the extensible belt (see the following section of this article).

Extensible Belts

Provide the advantages of belts, including completely continuous operation, in face haulage as a result of special facilities for quick extensions of 50 ft before adding in another belt section. Apparently the best transportation unit yet for developing the maximum capabilities of the continuous miner.

The idea of a quickly extensible belt conveyor with built-in storage is not a new one. The Jones "flitting conveyor," for example, was tried out in 1929 but failed because of the cumbersomeness of the storage facilities and the fact that breaking the conveyor and putting in sections was a complicated and tedious job. It took the intervening years to 1952 to solve these and other problems and develop the present extensible units.

The advent of the extensible belt may not have been hastened by the continuous miner but there is no question but what it built up the pressure. This resulted from the relatively low production rate of the first miners, which meant a very low total per shift with the conventional intermittent form of transportation, particularly the shuttle car.

Attempts to achieve a greater continuity of miner operation with intermittent transportation included the use of surge cars and pickup loaders. Under the right conditions both resulted in significant increases, with the pickup loader possibly providing the greatest benefits in most instances.

The conveyor, however, interested designers because of its inherent continuity of operation. The problem was modifying it to meet the requirements of easier moving and extension. The bridge conveyor riding on the standard chain-type room unit was one answer. Another was the self-propelled articulated conveyor, which found one of its earlier applications, along with linked-together cascade units, in providing transportation behind remotely controlled continuous machines.

The extensible belt goes farther toward solving the problem of rapid extension without using complete conveying units, the storage and handling of which become somewhat of a problem even at normal room depth. The solution of this problem meant reducing bulk so that parts for a 1,000-ft unit could be accommodated underground without undue difficulty or special provisions for storage.

Capacity is such that the extensible belts have no difficulty in handling better than 150 or 200 tph. Thus, they fit in with the production capacities of the new high-tonnage miners. As a result, they are making possible 50 tons or more per crew man, and have figured in records of nearly 100 tons per crew member.

Performance underground already has resulted in extending the application of the extensible belt to slope sinking (*Coal Age*, November, 1956, p 68). With a special takeup to permit retracting the face end 100 ft, the unit is making possible advances of 4 to 10 ft per shift in a 9x18-ft slope with a four-man crew plus foreman and a rock-type loader. The future quite likely will bring new plans for extensible belts and continuous miners. For the present, however, some of the trends and developments are:

Room Length—Up to the full length of the longest belt, or 1,000 ft. The minimum to date seems to be somewhere in the neighborhood of 500 ft. Normally, the tendency should be to work the longest possible distances to reduce the number of moves and the accompanying extra setup expense. Some extra over maximum length can be accomplished if elevating-type shuttle cars are available. Two of these in tandem, as an example, permit reaching through a chain pillar at the end of the room.

Panel Haulage—Belts seemingly have the lead in panel haulage behind extensible units, possibly because it is simpler to put the transfer into mine cars a little farther out on the main line, where a better setup can be provided.

Concentration—To date, the trend seems to be toward only one machine per panel, though some plans have been drawn up for two or more. Multiple units bring up not only supply and other problems but also the questions of volume and velocity of air and the handling of dust.

Basic Attack—The logical plan with extensible belts and miners is to drive the place up and then take the pillar next to the gob on the way back by open-ending or pocketing. Another plan, used with fixed-head machines, is to drive a pair of places with thin pillars leaving a thicker solid pillar against the gob. This thick pillar is then mined by pocketing, leaving thin fenders, which are cut through for the final operation.

For the New Revenue Year

A specialist on coal mining taxation gives a roundup of the latest court decisions and IRS rulings on:

1. Percentage depletion as it applies to company stores and other nonproductive activities, mine waste, aggregation of properties, strippers' "economic interest," and capital gain sales.

2. Accelerated depreciation as it affects salvage values, leasehold and mine improvements, and equipment wear.

3. Deductions for vacation-pay accruals.

4. Stock-option payments to executives.

5. Profit-sharing plans.

What's New In Taxation?

By ERNEST O. WOOD
Certified Public Accountant
Arthur Young & Co.
Pittsburgh, Pa.

IN THE FALL OF 1955 we reported new developments in the field of federal income taxation to that date (*Coal Age*, November, 1955). In the months since then, taxmen, government and private, have been loading the tipple and grinding out new concepts of taxation in various sizes and grades. With the tax season here, it is a good time to take a look at some of the more important court decisions and administrative rulings which were added in 1956 to the labyrinth of our tax law.

Percentage Depletion

Nonproductive Activities—The coal operator may be entitled to a tax deduction for percentage depletion. Percentage depletion for the coal operator, basically, is a deduction equal to 10% of gross income from the mineral property but the deduction is limited to 50% of taxable income from the mineral property. This computation is relatively simple where the coal operator merely mines the coal, for almost all his income and expenses are included in the computation of his gross and taxable income used in arriving at the 50% limitation. Where, however, the taxpayer operates a company store and/or a mine village, there arises the question of how to compute gross and taxable income for purposes of the limitation. Common practice in the past has been to exclude from gross and taxable income from mining the profit or loss from nonproductive activities.

In 1956, the Internal Revenue Service reviewed this problem and set forth new rules to be followed. Revenue Ruling 56-433 recognizes that some mineral operators furnish their personnel with housing, food, supplies and services at a definite loss, thereby indirectly adding to the payroll. Other operators charge the personnel a normal price for such items and at the same time pay higher cash wages. Where the nonproductive activities are operated in a reasonable attempt to make a profit, the profit or loss from the nonproductive activities should be separated and excluded from the gross income and taxable income used in computing the 50% of taxable income limitation. On the other hand, where it is apparent that the benefits are provided either free or at a price which consistently results in a loss, gross and taxable income used to compute the percentage depletion limitation should reflect such losses because they represent in reality an increase in wages of the productive activities. Coal operators who suffer losses on their nonproductive activities should give some thought to these new rules before filing their 1956 tax returns.

Mine Waste—The Internal Revenue Code of 1954 for the first time permitted a deduction for percentage depletion when waste dumps are reworked. The Commissioner of Internal Revenue resisted the allowance of the deduction for years before 1954. Turkey Run Fuels, Inc. would not swallow a negative answer from the commissioner and met him in a district court in Pennsylvania. The taxpayer won but the government has appealed to a higher court. There will be additional battles to be fought over this issue but the success of Turkey Run Fuels, Inc. in the initial skirmish might cause some other coal operators to give it a try for pre-1954 tax years.

Aggregation of Mineral Properties—A great deal has been written of the advantages and disadvantages of aggregating mineral properties for computing percentage depletion. *Coal Age* (November, 1955) contained a coverage of this election which appears in the Internal Revenue Code of 1954. The code provided that the coal operator who wished to aggregate any of his then existing properties had to make an election to do so with the tax return for the first taxable year beginning after Dec. 31, 1953. For acquisitions after that time, an election would be made in the year during which the exploration, development or operation costs were incurred relating to the new acquisition. The Treasury Department has ruled that if an election to aggregate has been made, the election may be changed or a new election to aggregate made by an amended return filed within 3 mo after the commissioner's final regulations are promulgated. These regulations were released in tentative form in November, 1956, but probably will not become final until sometime in 1957.

Strippers Economic Interest—Depletion deduction is available to anyone who owns an "economic interest" in a coal property. When a coal operator owns the coal, there is little question but that he owns an economic interest in the mineral. The stripping contractor occupies an uneasy position, however, for the inherent question in a stripping contract is whether or not the contractor has an economic interest in the coal. In the past, where the contract could not be terminated at will or at a nominal price, and where the stripper depended upon the extraction and sale of the coal for his compensation, an economic interest probably existed. The cases which went to the courts in 1956 continued to place emphasis upon the same tests, particularly upon the second test. The courts agreed upon these tests. Each individual situation must now be decided in the light of its own facts. The coal stripping contractor who seeks the cherished percentage depletion deduction must familiarize himself with this situation and see that his contract actually grants him an economic interest in the property.

Capital-Gain Sale—In 1944, the Pittston Co. acquired the right to purchase and sell all of the coal from a mine owned by Russell Fork Coal Co. In 1949, Russell Fork paid Pittston $500,000 for all of the rights and interest under the contract. Pittston reported the receipt as a capital gain from the sale or exchange of a capital asset. The commissioner contended the receipt was ordinary income on the ground that the contract was not a capital asset and it was not "sold or exchanged." The tax court held that the contractual rights owned by Pittston were a capital asset and this asset was sold. Capital gain treatment was allowed.

Depreciation

Accelerated Methods—Taxpayers waited a long time for the final regulations relating to depreciation under the Internal Revenue Code of 1954. Interest was particularly high as to the treatment of the new accelerated depreciation methods allowed in 1954 for the first time: that is, the sum of the years-digits method and the double declining balance method. While no lengthy analysis of the regulations will be attempted in this article, the following points might be noted:

1. Strong emphasis on salvage value in depreciation computations is one of the keynotes of the regulations. In the past salvage values have been disregarded to a large degree. We should be prepared for a greater emphasis on this in the future by the Internal Revenue Service. Salvage has a direct effect upon the depreciation deduction. For example a taxpayer owns an asset which cost $1,000 and which has a life of 10 yr. If no salvage value is assigned to the asset, the taxpayer will have an annual depreciation deduction of $100 for 10 yr. If a salvage value of $100 is assigned to the asset, the annual depreciation deduction will drop to $90.

2. Where the estimated useful life of leasehold improvements is greater than the remaining life of the lease, the accelerated depreciation methods may not be used. Where the remaining life of the lease is greater, however, the new methods may be used.

3. The accelerated depreciation methods may be used to depreciate mine improvements.

Equipment Wear—In theory at least, if a piece of equipment is subjected to daily usage which is three times more than normal usage, it would be expected that the additional usage would reduce the useful life of the equipment. In the case of *Kohinoor Coal Co.*, the taxpayer operated certain shovels and trucks on three 7-hr shifts each day. Normally the equipment would be operated on one 7-hr shift. Taxpayer contended that this additional usage reduced the life of the equipment and so it should be depreciated at a faster rate. In addition, the taxpayer stated that the equipment was obsolete and this fact should cause more rapid depreciation.

The tax court disallowed the additional depreciation. The first contention of the taxpayer was rejected because, while the taxpayer showed extra usage, it did not prove that the extra usage actually reduced the useful life of the equipment. The theory of the court here was the same that it used in 1951 in the case of *H. E. Harman Coal Corp.* The second contention was not acceptable because obsolescence was not proved merely by showing that more efficient and larger models were available, particularly where the taxpaver's models were still being made and where the taxpayer was still using the old models.

Vacation Pay

Deductions for Accruals—It has never been very clear under what circumstances an accrual basis taxpayer could deduct the cost of vacations to be taken by his employees during the following year. The Internal Revenue Service is planning to put into effect in the near future a new policy on vacation pay accruals. While the new policy clarifies the picture to some extent, it is a strict policy and many taxpayers who have been successfully deducting vacation pay accruals in the past are in danger of losing their deduction under the new policy. The new policy, which will apply to taxable years beginning after Dec. 31, 1956, will allow a taxpayer to accrue vacation pay as an expense only if the employer has a liability at year-end to pay the specific employee his vacation pay and if the specific employee's right to a vacation during the following year can not be forfeited by termination of employment or discharge.

In other words, the employee must have a "vested interest" in the vacation he has earned. In addition to this requirement, the amount of the liability to each employee must be capable of being computed with reasonable accuracy if the liability is to be accrued for tax purposes.

While many taxpayers will suffer because of this new policy, other taxpayers will turn the new policy to their own advantage. These will be the taxpayers who have not been able to accrue a liability for vacation pay at year-end and who will now change their vacation payment plans to conform to the new rules. The taxpayers may receive a double tax deduction in the year that the change in plan is made. One deduction will be received for the actual vacations paid during the year and another deduction will be received for the vacation costs to be paid during the following year but which are accrued at the end of the "change" year in accordance with the new rules.

It might be remembered that this new policy was first slated to go into effect for taxable years beginning after June 30, 1955. The effective date has been extended several times until now the effective date is Dec. 31, 1956. The effective date bears watching—it may be extended again.

Stock Options

Payments to Executives—Recent economic developments have produced growing pains in many areas. One problem has been how to compensate an executive when he reaches an income tax bracket where further salary increases would have to be quite substantial to be of value. A variety of solutions have come out of this problem ranging from free coal for the employee's stove to use of a company yacht for a long vacation in some southern sea.

(Continued on next page)

Among smaller companies, the employee stock option has been used frequently. Under this plan, the employer gave his employee the right to purchase from the company a specified number of shares of the company stock at a price below the market price at the date the option was granted. The company would deduct as an expense the difference between the option price and the market value on the date the option was exercised. The employee would claim that he was not subject to tax on the difference between the option price and the market value because the transaction was not designed as additional compensation to him but rather was designed to do nothing more than give him a "proprietory interest" in the company.

This plan enjoyed considerable, but not consistent, success. Then Michigan Chemical Corp. gave options of this type to Philip LoBue. The Commissioner of Internal Revenue contended that Mr. LoBue realized income when he exercised the option—the income being the excess of the market value of the stock over what Mr. LoBue paid for the stock. Mr. LoBue fought the commissioner in the tax court of the United States and in the U. S. Court of Appeals for the Third Circuit. He won both battles.

Final Test—The commissioner called for a third and final test in the Supreme Court of the U. S. This was the big test and Mr. LoBue lost it. The Supreme Court rejected the whole concept of "proprietory interest" and taxed LoBue on the spread between the option price and the market value at the date the option was exercised. It is generally conceded as a result of the LoBue case that this particular plan has little value as a means of compensating key men in the future. Many employees who now hold such options will hesitate to exercise them if it means adding to their already heavy tax burden.

Is there anything of value left in the stock option? The Internal Revenue Code provides for what is called the "restricted stock option." To qualify, the stock option must meet fairly precise tests as to option price, nontransferability of the option, period for holding the stock and the like. If the option meets the requirements, favorable tax treatment is assured to the employee. In view of the LoBue decision, more employers will turn to the restricted stock option for their employees.

Profit-Sharing Plans

Predetermined Formula — Profit-sharing plans have long been recognized by larger corporations as excellent sources of tax savings both for the corporation and for the employees. With the present expanding economy, the use of profit-sharing plans is spreading rapidly among smaller and medium-size firms. It is not within the scope of this article to discuss the many advantages, both tax and nontax, which accrue from the use of profit-sharing plans which have been approved by the Treasury Department. Let it be sufficient to say that the progressive coal operator should be familiar with them. Here we merely wish to point out to present users of profit-sharing plans the new developments in that area.

For many years the Treasury Department held the position that a profit-sharing plan must contain a predetermined fixed formula for determining the profit to be shared. This requirement worked a hardship in instances where an employer wished to contribute to the profit-sharing trust an amount which was more or less than that called for under the formula. The Treasury Department recently eliminated the requirement that the profit-sharing plan contain a predetermined formula and so has given management more discretion in the amount of the profits to be shared in each year.

The Treasury Department has made it quite easy to eliminate the predetermined formula from the plan. According to the Treasury Department, the employer may simply amend the plan to eliminate the formula. The amendment does not need the approval of the Treasury Department so long as it fulfills the following requirements:

1. It must be in writing and signed by competent parties.
2. It must be definite so as to be a part of the profit-sharing plan.
3. It must be communicated to the employees before the contribution to the trust is made and before the end of the taxable year.

In view of this new attitude on the part of the Treasury Department, it is suggested that old profit-sharing plans be reviewed if management wishes more flexibility in the operation of the plan.

Liability for Payment—As a general rule, contributions by an employer under a profit-sharing plan (and what we have to report here applies also to pension, annuity and stock-bonus plans) can be deducted for tax purposes only in the year that they are paid. An exception to the rule exists in that an accrual basis taxpayer may pay the contribution after the close of the taxable year, but before the date the tax return is filed, and still deduct the contribution in the year to which it relates.

The new regulations of the commissioner provide that in order for the exception to the general rule to apply, the taxpayer must incur a liability to make the payment. While the regulations do not tell us just what is meant by "incurring the liability," the author has been advised that the liability requirement may be met by the terms of the plan, if the plan contains a formula from which the dollar amount of liability can be calculated for each year. It is not sufficient if the formula is stated in terms of benefits eventually to be paid. With respect to pension past service costs, the plan must require a specific amount to be paid each year. There is no past service liability under the plan at the end of any particular year if the pension plan merely provides a formula from which the ultimate liability for past services can be calculated.

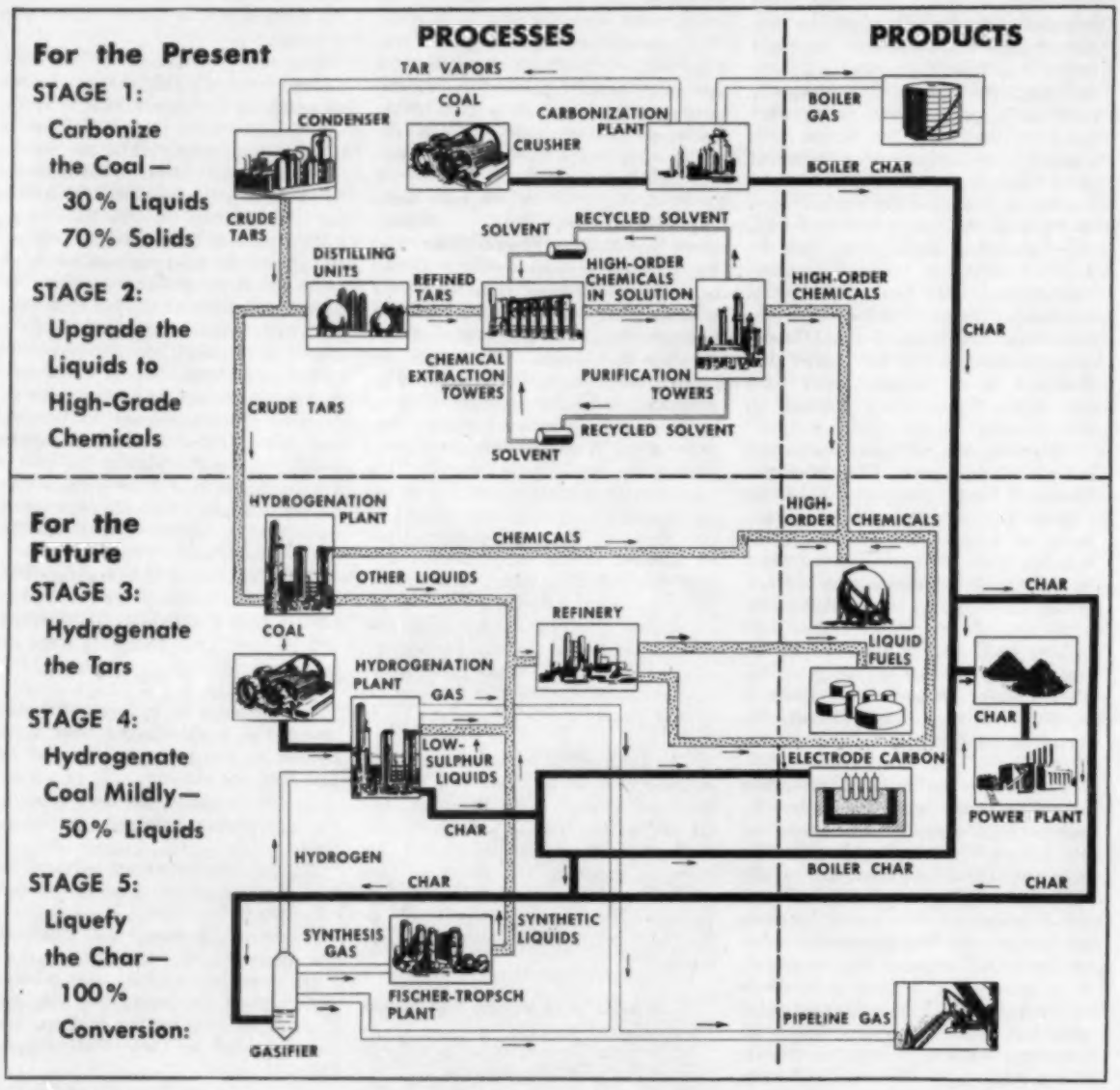
If the liability is not established by the plan itself, the Revenue Service advises that the liability requirement will be met if the following steps are taken:

1. The liability for the contribution under the profit-sharing plan is recorded on the books at year-end before they are closed.
2. The board of directors approves the contribution before the end of the year.
3. The employees are advised before the end of the year of the contribution to be made.

Undoubtedly many will object to the necessity of carrying out these three steps, but until we have a better definition of "incurring the liability," it might be wise for the coal operator to be guided by these three suggestions.

Travel and Entertainment Expense

Importance of Records—Taxpayers are still having trouble with their deductions for travel and entertainment expenses. One reason why taxpayers fail to get deductions for business travel and entertainment expenses is that the expenditures cannot be proved. The solution to this problem continues to be the maintenance of better records. A review of court cases in 1956 reveals that the taxpayers who kept accurate records of expenditures for travel and entertainment carried home their shields from battle. Those who had no records, or who had inaccurate records, were borne home on their shields. Accurate records are still the best protection for the deduction.



CARBONIZATION: Yields chemicals and char for Pittsburgh Consol, may later produce liquid fuel and high-Btu gas under the proper economic conditions.

New Markets From Coal Research

By JOSEPH PURSGLOVE JR.
Vice President, Research and Development, Pittsburgh Consolidation Coal Co., Pittsburgh, Pa.

How the coal-to-char-to-electricity process was developed and how it will be employed at Kammer power station, at Cresap, W. Va., to yield chemicals from coal in addition to power-plant fuel.

Plus a discussion of coal pipelining and how it can fit into coal processing in days to come.

Plus an analysis of the possibilities of large-scale production of liquid fuels and high-Btu pipeline gas from coal in the future.

AFTER almost 10 yr and an outlay of $14 million, we at Pitt Consol feel that we have learned where the relatively near-term possibilities lie for coal processing, and where several longer-term, very promising opportunities can be developed by further work.

When Pitt Consol was organized late in 1945, the president had this to say about coal-research objectives:

"There has never been a coal company with the tonnage volume and financial resources that could do the research and development work necessary to keep coal in the forefront as a supplier of energy and chemicals as required by our expanding economy. We believe Pitt Consol will be in such a position and we visualize an active and vigorous program of research and development to accomplish these objectives."

Late in 1946 I was given the job of setting up a research and development organization that could find new and significant uses for coal. The assignment was as broad as that. I asked for a definition of the word "significant" and was told that for a company which at that time had more than 1.5 billion mineable tons of coal as reserves for the future (we now have over 2 billion), no processes or plans using annual tonnages of less than 500,000 to 750,000 would be "significant." I asked one more question. I was told that the money would be made available for any project or projects that our group could justify as having some chance of success. (Actually, things have worked out that way.) With these instructions, we started in 1947 to put together a group capable of tackling this problem. Up to this period, none of our officers or directors had been involved in research and development projects on coal to any significant extent.

GASIFICATION TO CARBONIZATION

One of our initial projects was devoted to the gasification of our large reserves of high-volatile Pittsburgh seam coking coals using the fluidized solid techniques developed by the oil industry for fluid catalytic cracking. Our partner in this venture was Standard Oil Co. of New Jersey. The aim was to find a very high-capacity continuous method of converting Pittsburgh-seam coal into a gas suitable for synthesis into liquid fuels.

We proved to both our satisfactions that "synthesis gases" could be produced by this method using oxygen and steam as the fluidizing medium. But the process was only economically attractive when huge quantities of "synthesis gases" were required for large synthetic liquid fuel plants. Such plants would cost multiples of millions of dollars, while toward the end of this development the economics of the world petroleum business were rearranged by the opening of the vast new oil fields of the Middle East.

In other words, the commercialization of a straight synthetic liquid fuels process was not feasible in 1950. We decided to put the pilot plant reports on the shelf for future reference and continued work in the lab on radical improvements in gasification techniques. We are still at it. At the same time we turned to more near-term possibilities. As of now we know of no method or process for converting coal completely into liquid fuels that is economically attractive under today's conditions in the U.S.A. However, the tremendous growth in the use of liquid fuels all over the world and the conflict in the Middle East suggests that we should be prepared to move when the time is right. We believe we will be in position to do so.

In 1948 we began work on the application of this same technique to low-temperature carbonization through the knowledge we were then deriving from working with fluidized solid techniques in the gasification process. Up to the present, this development, along with the organic chemical work on the coal liquids produced, has occupied the greater part of our efforts, time and money. Almost eight full years have passed. Our one other sizeable project was the development of cross-country pipelining of coal, which I'll discuss later.

ALUMINUM THE SPARKPLUG

These years of work are culmi-

Abstracted from a paper presented before the American Coke and Coal Chemicals Institute, 1956.

nating in the coal processing developments at Cresap, W. Va., 8 mi south of Moundsville on the Ohio River.

We have learned through continuous economic analyses of our coal processing research that commercially it must be done on a very large scale to be attractive economically. In the case of low temperature carbonization we must also have a large power station adjacent to our plant that can burn coal and/or our char residue with equal economy under the boilers. We believed last year that if we had both these factors in hand, that is, a large power station as well as one that could burn char, we would be ready to go ahead with our first commercial plant.

About this time the large new aluminum developments projected on the Ohio River—Kaiser at Ravenswood, W. Va. and Olin-Mathieson and Revere at Hannibal, Ohio—materialized. They, we knew, would create a new demand in the American Gas & Electric Co.'s system of approximately 900,000 kw. Philip Sporn, AG&E president, has carefully planned to have several huge new units going on the line each year to take care of the system's normally growing needs, but whole new arrangements of great magnitude had to be made for these new additional blocks of power in his territory.

One such plan was for an entirely new power station, now under construction at Cresap, on a site we owned. This site is on top of a large tract of coal our company controls. The tract contains close to a billion tons of mineable Pittsburgh-seam coal along some 16 mi of the Ohio River with Moundsville close to the midpoint. This new station is named Kammer, for H. A. Kammer, executive vice president, American Gas & Electric. It is being designed and built under Mr. Kammer's direct supervision so that it will burn coal and/or char as noted above. Olin-Mathieson and Revere will own two of the three initially installed 225,000-kw units, and AG& E the third. Kammer station is planned for an ultimate capacity of 1,350,000 kw. American Gas & Electric will manage the station, provide standby power, and integrate it into its seven-state system.

We have been working with Babcock & Wilcox and American Gas & Electric for several years on the problems involved in the burning of our low-volatile char. Both exhibited the true scientific pioneering spirit that is so essential to get any laboratory and pilot-plant results translated into a commercial accomplishment. We are very grateful to the personnel of both organizations and can tell you that there are a lot of very sound reasons why they are both leaders in their respective fields.

THE CRESAP PLAN

With the 675,000-kw Kammer station being built to burn our char, we had the foundation laid for our own developments. First, an entirely new mine, named the Ireland mine for R. L. Ireland, chairman of our executive committee, is now being opened. It will have a productive capacity of 3,000,000 tons a year, and can be expanded to 5,000,000 tons as the Kammer station grows. Coal will be delivered directly by belt from the mine slope into the 450,000-ton stockpile of the power station. Our low-temperature carbonization plant, or char maker, as we call it, will be located between the stockpile and the boilers. Coal moving in a direct line from mine to stockpile to boilers can be intercepted and passed through the char maker. Char is then put back into the former coal stream and moves along through the bunkers and feeders into the cyclone burners.

The liquids removed from the coal, approximately 26 to 30 gal per ton of coal treated, are then moved through a whole train of liquid processing, refining, purifying and manufacturing steps to make products that (1) have qualities that will permit them to fit into late 1958 and 1959 markets; (2) that will go into markets large enough to absorb such a production volume at one geographical location; and (3) that will sell for enough in the 1958-59 markets will make the $30 million dollar investment in plant and working capital an attractive one.

Let me say again that a very sizable percentage of all the money we have invested in low temperature carbonization research has been spent on the organic chemistry of the liquids we would produce, and in the search for and development of the marketing outlets we have to have. We thereby have hoped to avoid making the mistake of so many developers and promoters of low temperature carbonization processes. Of course, one must have a process that is as good as possible from a chemical engineering viewpoint, but the best process in the world is simply a scientific museum piece if the products will not yield enough gross income to make the whole venture attractive commercially. This sounds like a very naive statement but I find myself making some such statement to would be entrepreneurs in this field each month.

If our first premise is correct, i.e., that this type of coal processing must be done on a large scale to be attractive, then as night follows day the major outlets for the liquid products must be large-volume outlets. Special markets for 2, 3 or even 5 million gal a year of our liquid products will be most desirable and we intend to get some very welcome plus values from these types of specialty outlets. But we will have to dispose of about 50 to 60,000,000 gal of refined liquids a year. Five million gallons, or about 45,000,000 lb of material is a lot of stuff in the chemical industry, but it's less than 10% of our output.

MOVING THE PRODUCTS

Here is how we plan to move our production. The lighter ends, approximately 15% of our total, will be distilled out first and processed on a parallel course with those produced from the petroleum cresylate streams we now handle at Newark. In this connection, we are already operating an old plant at Newark, and also are building a new plant based upon our own process to refine petroleum cresylates. We had already gone into this cresylic acid business to get a running start in these markets before we approached the Cresap venture. We are very glad that we took this step because it will in effect give us a 3-year start.

The Cresap cresylic plant will be designed after we have run our new Newark plant for several months. This plant is now being put on the line. We believe that whole new uses for these acids, in addition to the natural market growth, will absorb this large production. We will also fill the gap left as "ADF" imported material gradually disappears from U. S. A. markets because of the growth of West European chemical and manufacturing activities.

The intermediate materials consisting of 35 to 40% of the total will be split into a number of products:

1. Highly effective wood preservatives.
2. Road tar components.
3. A feedstock for a carbon-black plant.

We are currently working on commercial arrangements for the disposal through regular market channels of the wood preservatives and road-tar components, and expect to be in the carbon-black business with a partner or partners by building a modern furnace-black plant at Cresap. Such a development will bring something new into that business because all present furnace blacks are produced in the Southwest and Gulf Coast areas from very special aromatic feedstocks from oil refineries.

The carbon-black plant we envisage will make approximately 50 to 60,-

000,000 lb per year of abrasion blacks. This is a small percentage of the total U. S. A. market of around 2 billion lb a year, but it's an appreciable item in the northeastern U. S. A. abrasion-black markets. Here again we plan to use regular marketing channels.

The heavy bottoms will be fed to a coker producing a green coke. This green pitch coke will be mixed with green petroleum coke from Sohio's new Toledo and existing Lima refineries. These mixtures will be calcined at a new plant being built at Cresap by Mountaineer Carbon Co. This is a jointly owned corporation of Pitt Consol and Sohio put together for the purpose of building and operating the calcining plant and marketing the electrode carbons produced.

This, then, is the presently contemplated complete picture at Cresap. No doubt, further processing equipment of one kind or another will be added to the plans before the whole complex is in operation. We are thinking of producing resins and several different derivatives of the acids. No one has ever had such quantities of these materials "under one roof" so to speak, so the possibilities here of large-scale further processing are almost unlimited. We invite chemical processors to consider us as new large-scale suppliers so that they, along with us, can look down new chemical-processing vistas. Frankly, we would hope to be able to dispose of over half our total acid production by further processing by us or others in this manner.

PIPELINING COAL

I mentioned the coal pipeline project previously as one that had also absorbed a lot of our time and money. Before proceeding to the future as we see it, I want to discuss the pipeline because in a way it ties in with coal processing.

Our 110-mi line from southeastern Ohio to Lake Erie is all in the ground. It has been pressure-tested and water has been moved through its entire length. Coal shipments will begin late this year when the terminals are completed. We expect to pump 1,300,000 tons of coal a year in a 50:50 coal: water mixture through the line, which we expect to last more than 20 yr. There are three pumping stations, one at the origin and two along the way. It is obvious that if you can pump coal 110 mi, you can pump it 1,000 mi if the economics (that is, the competitive transportation means) justify such an installation. The present line is 10¾ in. An 18-in line, which is perfectly practical, would handle 4 to 5 million tons a year. Consequently, it is not difficult to visualize large volumes of coal moving long distances in this manner.

The reason coal pipelines have a relationship to coal processing is that pipeline coal is of the right size for low-temperature fluidized carbonization. The pipeline terminal at a power station could be greatly simplified if a carbonization plant were between the end of the line and the power station's boilers. Sizable credits would be available to be applied to both the pipeline terminal costs and the carbonization plant costs.

The future combination of pipelining coal and then processing it hundreds of miles from the mines could greatly alter the geographical distribution of our energy supplies and the geographical points of production of coal chemicals. It is an idea to provoke much thought for future commercial possibilities.

COAL CHEMICALS TOMORROW

We believe that once the burning of char efficiently has been demonstrated, and that once the high-capacity, fluidized-solid, low-temperature carbonization process also has been demonstrated on a full commercial scale, one can begin to plan on other manufacturing complexes consisting of coal-to-char-to-electricity, to chemicals, to pipeline gas, to gasoline, to synthetic rubber, and so on.

Many people and organizations over the years have been thinking primarily of single-purpose coal-processing plants—for example, plants where a black ribbon of coal flows into one end, and a fat stream of high octane gasoline moves out the other. We have fould by a long and tedious process of economic trial and error that only multiple purpose plants attached to whole trains of other chemical processing plants can be economically attractive at this time. Cresap plans are a good example of this type of development. If one accepts this premise, then such installations will cost hundreds of millions of dollars for large electric power stations, char-makers and chemical plants, and ultimately synthetic liquid and gaseous fuel plants. The very size of the overall investments required will have a tendency to restrict the location and numbers of such layouts.

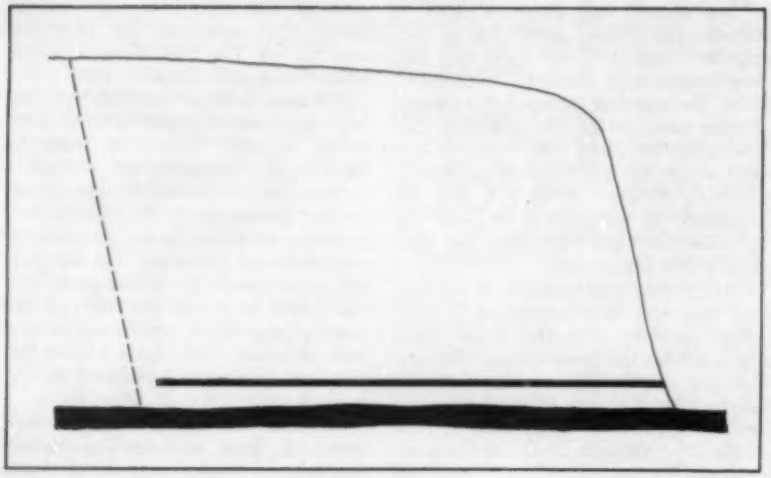
You have all heard of the proposed low-temperature carbonization plants for Colorado, Wyoming and Montana. We recently had occasion to review one situation in Wyoming. The entire electric utility power load of this vast state is less than 150,000 kw. It may be 300,000 kw 5 yr from now. In contrast just one of the Kammer station's three generators will produce 225,000 kw. Where would one dispose of the char in volume in Wyoming? There is no need to ask where one would dispose of the chemicals and carbon black! The same sort of problems exist in all the Far-Western states where large coal deposits exist.

We now believe that this type of large-scale development will be best suited, in this lifetime at least, to Eastern coal deposits on navigable waters and adjacent to large-scale electric power plants. We believe that in such locations large volumes of so-called coal chemicals can be produced economically. These same liquids could be the source materials for further large-scale processing into a host of other than "coal chemicals" that are in growing demand in the U. S. A.

In addition, big incremental volumes of these hydrocarbon liquids could be converted into liquid fuels and high-Btu pipeline gas. These energy markets are the huge ones, so if many plants such as the Cresap complex are built, only such markets could absorb the excess over chemical uses of the liquids. Let's see what can happen at Cresap alone in a relatively short time. Additions to the Kammer station providing outlets for more char could provide opportunities for incremental investments in addition to the various coal and liquid processing plants there. Improvements in technology, now under development in our laboratories, could easily increase our liquid yield per ton treated by at least 50%. A combination of the two factors could multiply over-all Cresap liquid yield three times over the next few years and thus make conversions to liquid and gaseous fuels economically attractive because you would make them incrementally. I am not contradicting what I said earlier about no process for converting coal completely to liquid and gaseous fuels in the U. S. A. being economically attractive today. My former statement did not apply to whole complexes as envisaged here, but to synthetic fuel plants producing only one or two basic products.

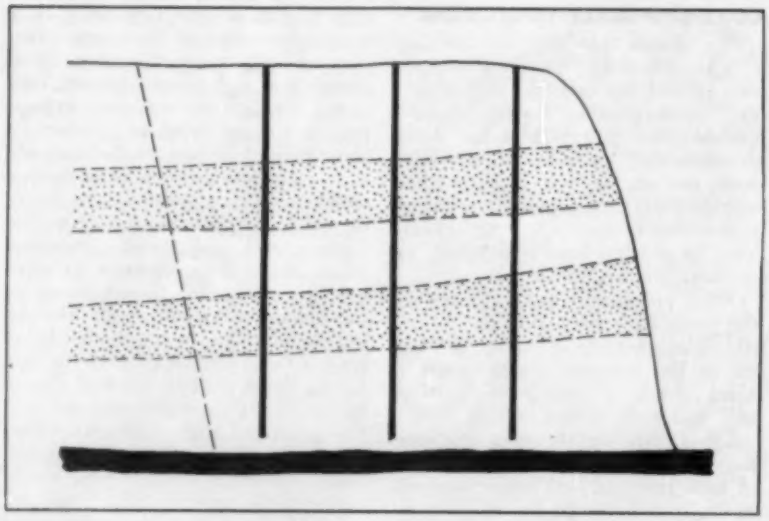
One can conclude then that we are on our way, and the foundations are being laid for a whole new source of liquid hydrocarbons in northeastern U.S.A. Into what form these sources will be ultimately converted only time will tell, but whole new industries for this part of U.S.A. are in the making, and whole new frontiers for chemical processing will be opened up. One need not worry about a shortage of supply.

Since being admitted to the chemical congregation we have often heard the expression used, "The chemical industry is its own best customer." We look forward with pleasure to serving it.



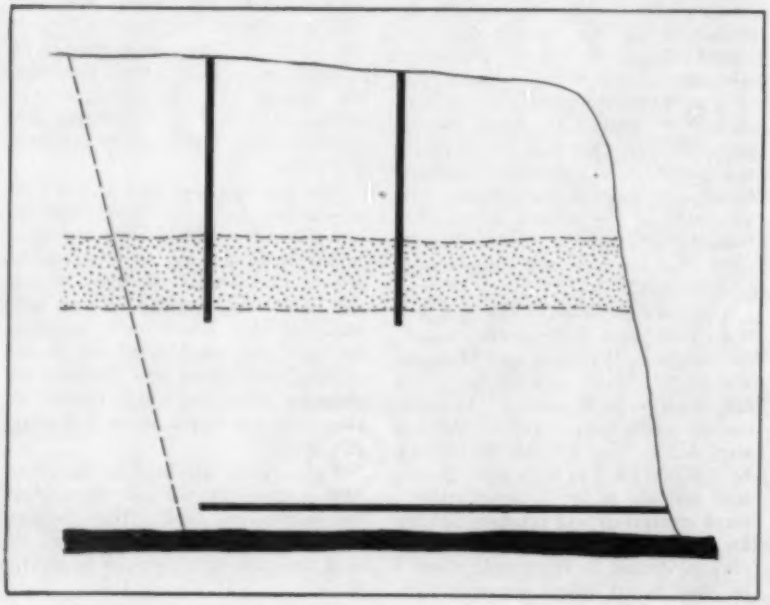
Horizontal Drilling

Normally for thinner cover with a minimum of hard material, especially up in the bank. Low in cost where conditions permit use.



Vertical Drilling

Preferred for deeper banks, especially where there is considerable hard material toward the top. Permits deck-loading. New drills provide high drilling speeds and big holes for higher concentrations of breaking effort.



Combination Patterns

Normally employed in thicker-than-average cover and to meet special conditions. Patterns vary considerably. More frequently, vertical drilling may be employed in one part of the pit and horizontal in the other.

Overburden Preparation Today

What today's drilling units, drilling patterns and breaking mediums are, how they meet today's conditions, including heavier burden, and what they provide in stripping results.

THE THREE MAJOR STEPS the coal-stripping industry has taken to reduce the cost of overburden preparation are:

1. Higher-capacity drills able to make much larger holes than in the past.

2. Lower-cost breaking mediums giving as good or, frequently, better fragmentation.

3. Better distribution of the breaking mediums to put the force where it will accomplish the most.

DRILLS: Up to 12-In Holes, Over 250 FPH

Drilling in the coal-stripping industry has almost but not quite completed the circle. Around 25 yr ago, the majority was handled by the old, slow, churn-type machine. Then the sidewall unit, developed under the direction of the late R. H. Sherwood, moved in. Because of its ease of handling and greater drilling speed, it pushed the churn drill nearly out of the picture. But as overburden thickened and the breaking problem became more complicated, the vertical unit came back in the form of a rotary machine. As a result, the stripping industry now has a variety of machines to meet practically any conditions.

1. Sidewall—As originally designed, the sidewall machine was an augering unit with a molefoot-type bit. This design of bit, even though range and speed have been increased by alloys and tungsten-carbide, still is limited to penetrating relatively soft material, such as, shale. Otherwise the drilling rate drops and bit wear increases.

There still is a lot of good sidewall drilling left and designers are moving to improve the machines to meet, among other things, the need for much-larger holes and higher speeds, cutting labor cost and, possibly, reducing the number of holes while making possible more-effective use of the explosive. Conventional units already are putting in holes up to 8 in. New types include a rotary for use in hard rock close to the coal. One such unit bores a 7¾-in or larger hole and has a thrust of 40,000 lb on the bit.

Special designs that have or are being used include the two-story unit for thick burden where there is a hard layer high up. Another self-propelled unit includes special facilities for adjusting drilling height within a range of several feet to compensate for changes in the thickness and position of the drilling stratum over the seam.

2. Vertical—The rebirth of the vertical drill reflects, as previously noted, increased thickness of overburden. This brought in, among other things, the problem of getting the explosive closer to the material to be broken, especially hard layers high in the bank. Ability to drill holes 12 in larger in diameter at greatly increased speeds is another major asset. In the realm of speed, a report received at the time this article was being prepared on one new unit just put into the field showed that one operator, in a test run, put down 24 holes, aggregating 855 ft, in 3 hr 36 min, or approximately 238 fph. Maximum hole size for this machine is 9 in. With another earlier machine at another property, a three-man crew has been able to drill 1,000 ft of hole and shoot 30,000 cu yd of material in a single shift.

Big-drill advantages also include an opportunity to use less-dense lower-cost blasting mediums; clean, smooth holes; and excellent stemming from the dry drill cuttings.

The success of the super drill has led to a number of advances other than in drill design itself. One is mounting drills with laydown masts on tractor chassis for greater flexibility and more speed in moving from hole to hole and place to place. Another is the development of lighter, smaller, more-mobile and less-expensive units for the smaller operator. Mountings include both trucks and crawler, with the truck widely employed. Drilling speeds are the same, though hole size has not yet reached the tops registered by the super units.

Gadgets and gimmicks designed to improve results with the vertical drill include extra-tall masts to permit drilling the entire hole depth without stopping; auger-type stems to help in the job of bringing the cuttings to the surface; and the use of augers to penetrate clay or soil which tends to squeeze and close holes, following with the regular rotary tool. An extra tool change is involved but overall hole time is reduced and there is less wear and tear on the rotary bit.

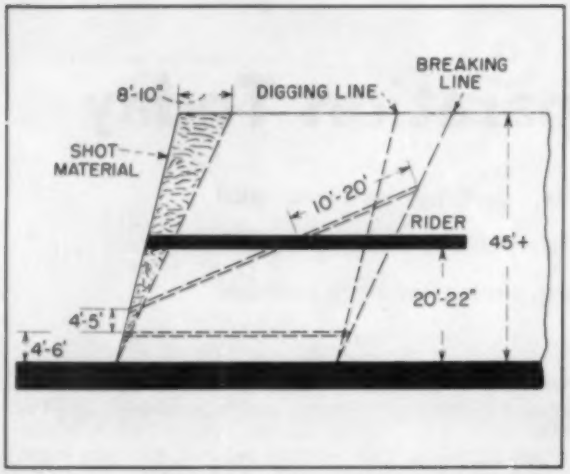
Vertical augers are another form of vertical drilling unit and have been improved to the point where they can drill a 9- or 10-in hole in coarse-grained sandstone up to 100 ft or more in depth.

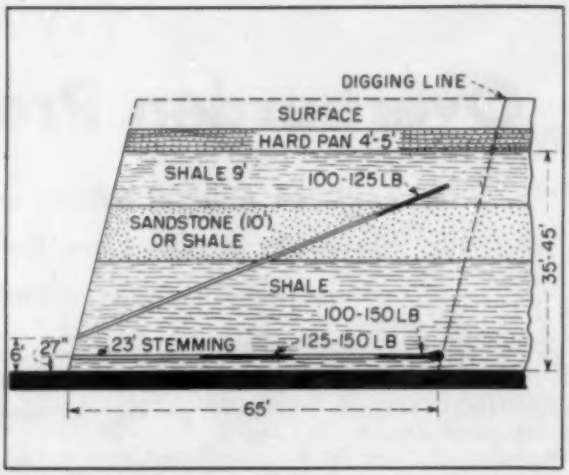
3. Specialized Units—In the realm of overburden preparation, the specialized unit normally is a wagon drill or a tractor-mounted jumbo. The normal service is drilling a thin layer of hard rock over the coal where the major part of the overburden can be dug without blasting, or drilling a heavy parting or interval between two seams. Twin-unit jumbos mounted on tractors are a popular version.

SIDEWALL PATTERNS: Over the Coal or Horizontal and Angle

One coal-stripping operation recently featured in *Coal Age* (June, 1956, p 60) provides examples of both single and over-and-under or horizontal-and-angle sidewall drilling. In one pit, where the cover is 65 ft deep and consists primarily of shale, 6-in horizontal holes on 18-ft centers are drilled 2 to 3½ ft above the coal. Even though the cover is thicker than that normally considered within the range of the horizontal drill, the fact that it is primarily shale permits good breaking.

Balancing charge and burden provides some problems in horizontal





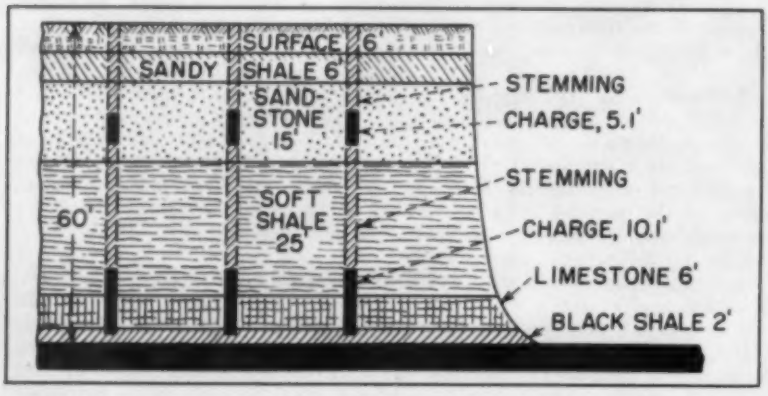
HORIZONTAL AND ANGLE PLANS for sidewall machines include the two shown above. The objective of the upward-angling hole normally is to put part of the explosive up toward the top of a high bank or in a hard layer.

drilling, as well as in other types. Attempts to break hard layers high in the bank by closer hole spacing can result in shearing between holes, while increasing the charge also increases the possibility of blowing up through the burden or out to the front.

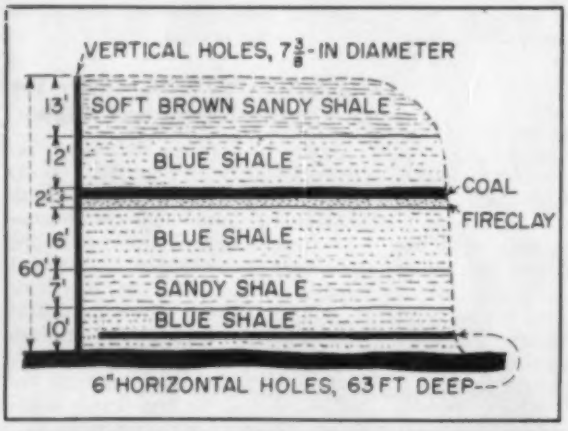
At another pit of the previous company, where sandstone is encountered, a closer approach to the desired explosive distribution is achieved by a combination of horizontal and upward-angle holes. Horizontal holes are drilled on 18-ft centers, but only 45 ft deep. Angle holes to break up the sandstone are staggered with the horizontals. The company, however, plans the purchase of a super vertical rotary for use where the sandstone is high in the bank.

Decreased pit width, as in the previous example, may be necessary with horizontal-angle patterns for either or both of two reasons (1) to keep the length of the angle hole within reasonable limits, and (2) to get the upper charge forward for better breaking of the front of the bank. Splitting charges can be easily done in the horizontal holes, but is less effective or efficient in holes that angle upward.

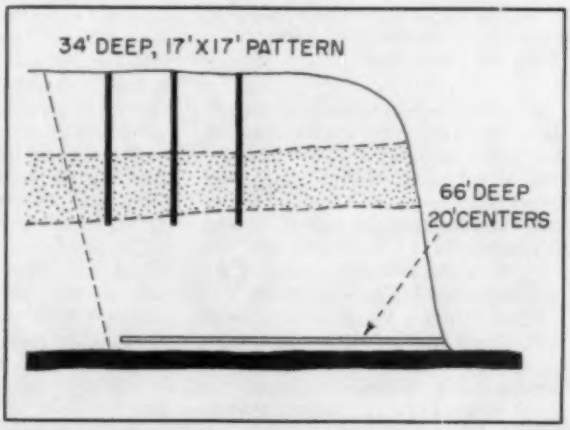
Placing explosives and stemming requires more time and labor with side-



DECK LOADING to get part of the breaking force up into hard layers high in the bank is one of the major reasons for vertical drilling in thick overburden.



FULL-DEPTH HOLES at the back of the cut supplement horizontal holes in this combination plan.



SHORT VERTICAL HOLES to a hard band up in the bank supplement horizontal holes in 70 ft of cover.

wall drilling. Even so, there have been few attempts to develop power tamping equipment. One of the few machines designed a few years ago used a system of quick-reversing rollers with friction grips to operate the tamping bar for placing explosive containers and stemming bags.

VERTICAL PATTERNS: Deck Loading Or Bottom Placement

Basic patterns for vertical drilling have not changed greatly even though the vertical unit of today is radically different from that of years ago. Vertical drilling, incidentally, in contrast to horizontal, permits, if desired, establishing a buffer zone of a cut or more between the area being shot and the stripping front. Since the horizontal machine must always work in the pit, its operation must be synchronized with the progress of the stripper. Thus, a buffer zone is impracticable, though the drill may be able to work behind the excavator. However, shooting must be done against the open pit face, with consequent increase in the possibility of caves and slides where the material tends to be unstable.

The mobile drills, truck or crawler-mounted, are producing some modifications in technique, particularly in hillside stripping areas. At one property (*Coal Age*, August, 1956, p 88) the first step is to bulldoze a road at the back of the new cut to accommodate the drill. Holes on 15-ft centers are put down to depths that will yield a 50-ft bench. When shot, the material is pushed over the bank and the bench is levelled off. Then three rows of holes 12 ft apart in rows 15 ft apart are drilled starting 5 ft from the edge of the bank. The main bed in the overburden is 30 ft of sandstone underlaid by 18 to 25 ft of shale over one of the three coal beds recovered.

With a 115-ft-wide cut at another property (*Coal Age*, September, 1956, p 64) three drill roads are cut by the bulldozer. Holes are put down on 20-ft centers along the two lower roads, and on 14- to 20-ft centers along the upper road. These latter holes are 55 to 60 ft deep. The upper and middle-bench holes are decked with the charges in two zones—bottom and somewhat over half up, while the holes in the bottom section are bottom-loaded. The bottom bench is shot first, followed by the middle and top benches. Delays of 9 MS are used between rows.

A dragline operation using a mobile drilling machine bulldozes most of the softer top stratum (up to 20 ft thick) on top of 25 ft of hard material into the pit before drilling. However, a skin of soft material is left for easier starting of the vertical holes and as a blanket to reduce flying material (*Coal Age*, April, 1956, p 82). The first row of holes is started 20 ft from the edge of the bank, with 18- and 17-ft spacing for the subsequent rows to compensate for harder material.

Freedom to deck load is, as noted, a major reason for vertical drilling. There are numerous variations on the basic plan. One, with the upper charges placed to break a layer of sandstone, is shown in an accompanying diagram.

Exact placement of the charges, particularly the upper, as well as variations to meet changes in thickness and location of the critical layers, has led to thorough logging of the holes at some properties, including the use of an automatic electric depth indicator. Drill-pressure indicators also show changes in the hardness of the strata and thus provide additional data for judging placement and quantity of charges.

COMBINATION PATTERNS: Answers to Special Problems

Overburden at one operation using a combination of vertical and horizontal holes (*Coal Age*, March, 1956, p 82) consisted of 10 ft of shale over the coal, 8 ft of lime, 6 ft of weathered sandstone, rider coal, 4 to 8 ft of sandstone (not always present), and shale to the surface. A bulldozer prepared a road at the back of the cut for a mobile drilling unit putting down 6-in holes on 15-ft centers (deck-loaded with 350 lb). Horizontal holes, 8 in, 66 ft deep, were drilled on 18-ft centers and loaded with 350 to 500 lb of 40% dynamite. Charges were set off with detonating fuse, with MS delays between vertical and horizontal rows, horizontal first. One objective of the plan was a smooth highwall for final augering.

Another plan for banks of approximately 60 ft or more is shown in an accompanying diagram. The 7⅞-in vertical holes are drilled on 15-ft centers. The vertical holes bottom 12 ft back from the ends of the 6-in horizontals, which are staggered with the verticals and drilled 63 ft deep. Hole loading is 0.4 lb of Akremite per cu yd, or 1,620 lb per hole.

Short vertical holes are used at some mines to break hard layers high in the banks. The plan at one operation with 70 ft of cover is shown in an accompanying diagram. Three rows of vertical holes 34 ft deep are drilled on 17-ft centers. Horizontal holes on 20-ft centers immediately above the coal complete the pattern. A 70-ft wide cut requires three rows of vertical holes and 66-ft-deep horizontal holes.

Another mine has employed two rows of holes near the back of the cut to break a limestone layer about halfway up the bank. With the limestone broken the horizontal holes have an opportunity to heave the overburden their full length. Cover depth is less than 50 ft, with the bottom 20 ft shale followed by the lime (3 ft) and surface material. Under such circumstances, attempts to break up the hard band by heavier loading of the bottom holes can result in the charge blowing up through the overburden and losing much of its effectiveness.

BREAKING: New Mediums Cut Overall Cost

The standard fixed explosives originally employed in breaking overburden still are used to some extent. Their cost, greater sensitivity and fast release of energy—too fast for many types of burden—have led to the development of less-dense, slower-acting and lower-cost blasting agents, and finally to the non-cap-sensitive mediums of today, which require a separate primer to set them off—Akremite as an example.

Some of the reasons, including less hazard and a less-sharp, more satisfactory rate of detonation, were responsible for the introduction of liquid oxygen in the 20's and for its continued use to the present time. Thus, the stripper has a wide choice of mediums and can, in effect, tailor-make his charges to the exact type and burden of material.

The detonating fuse and the MS delay have made considerable strides in blasting in the coal stripping in recent years. One reason is greater public sensitivity to blasting noise and vibration, in part reflecting the use of larger charges to break the heavier burden. Delays may be used between rows or between individual holes as well as between rows, depending upon conditions. In many instances these delays have reduced vibration to as low as 25% of the usual shot.

Other advantages of detonating fuse and MS delays include up to 15% faster detonation of the explosives with a reduction in requirements; as good fragmentation if not better; and less likelihood of an accidental explosion when digging into misfires as a result of the elimination of caps.

The characteristics of the rock and the drilling and stripping equipment control the type and quantity of the breaking medium and there no hard-and-fast rules can be laid down. In general, a dragline will require breaking the rock finer than for a shovel, and the larger the stripping unit the larger the size of the material it can handle.

Guide to Oil Treating

How oil spraying helps in dustproofing, preventing windage losses and air pollution, dewatering and preventing moisture reabsorption, freezeproofing, unloading, protection of stockpiles and control of bulk density.

How to select the proper oil and the proper treating equipment.

By JOHN STEWART and EVERETT KEY
Ashland Oil & Refining Co., Ashland, Ky.

GREATER EFFICIENCY is of course always the goal in the use of spray oil for domestic, lake, by-product and industrial coal preparation. The following guide to this higher efficiency is based on work in coal-cleaning plants, on docks at the Head of the Lakes, and at the plants of coal users.

Dealers first oil-treated coal to make possible dustless deliveries. The operators, quickly sensing the advantages of offering a dustless coal, soon installed adequate equipment to treat all sizes at the mines. As oil-treating became the general practice, coal customers discovered that such treatment offered other advantages, such as, faster handling, more complete dewatering, fewer frozen cars, water repellency, better bulk density control, less windage loss and less air pollution.

These new uses have led to special treating methods to meet the needs of different coal users. Custom-treated coals are the order of the day.

DUSTPROOFING

While dustproofing is the oldest primary use of coal spray oil, there is considerable misunderstanding about what oil can do and about how to treat various coals. Oil will control all float dust on any coal. Oil will not eliminate the fines, coarse or sink dust. This is a job for screening or cleaning at the preparation plant.

Efficient dustproofing of domestic coals is an entirely different problem from that of oil-treating industrial or by-product coals. How much oil and what viscosity depend upon the type of coal, size consist and moisture content. Dry coal needs complete coverage. Wet coal is easier to oil-treat because the hydrophobic action of the oil seems to chase the water off the coal, thus quickly spreading the oil all over the pieces.

PREVENTING WINDAGE LOSS, CONTROLLING AIR POLLUTION

Coal dust blown from a railroad car in transit or off a coal stockpile represents a direct loss of fuel value as well as public goodwill for the concern that pollutes the air. Machine mining has aggravated the situation because it produces more slack and fines with a high percentage of float dust. Cars of untreated carbon or slack may lose as much as 5 tons of dust in transit from mine to user. Oil treatment prior to shipment will reduce air pollution during shipment and after arrival at destination.

DEWATERING AND REPELLENCY

The advent of the modern cleaning and preparation plant has made dewatering coal a major problem. Moisture can be reduced and water pickup prevented by proper oil treatment. Oil-treated coals above 10 mesh will drain down to minimum moisture faster than untreated. Oil-treated 10x0-mesh coals will not pick additional surface moisture and are water-repellent. However, since raw coals are hygroscopic, the surface moisture often varies with humidity. In the case of thermally dried washed coal, the natural oil film is removed and oil treating is necessary to keep the coal from absorbing moisture.

Many coals dewatered in preparation show a high increase in surface moisture after a few weeks in the stockpile. This may be a result of colloidal impurities carried in the wash water, such as, slime, slurry, fire clay and rock dust, and not rinsed off the coal completely. These materials pick up moisture from the naturally humid air, from fog and from rain. The additions sometimes represent almost unbelievable amounts of water on and in the coal.

The solution to this problem is to flush the coal with clean makeup water before oil treatment at the cleaning plant.

WINTERIZING

Freezeproofing coal is part of the dewatering process. If there is not enough water on the coal there can be no frozen cars. The first step in freeze prevention is quick elimination of the water. Oil does just this. Should any remaining moisture on oil-treated coal freeze, the ice will break easily at the interface of the coal. If the coal is oil-treated and a top dressing of oil is applied as the car is loaded, the car will be winterproofed.

It has become a common practice

to spray the insides of cars with approximately 5 gal of oil before loading, which helps prevent the freezing of coal to the sides and bottom, and also speeds up unloading.

It is now possible to oil-treat coal to prevent freezing in cars, barges, stockpiles and silos. Thus, the proven and economical method of eliminating the problem of freezing in cars and stockpiles for coal dealers and consumers is winterproofing with oil.

FASTER HANDLING

Oil-treated coals unload faster and handle easier than untreated. Men who handle both treated and untreated coals in all types of weather and extreme heat and cold have learned this from experience. One by-product plant treats its wet barge coal with a very light oil as it is unloaded to keep it from caking and freezing to the conveyors. It would be more convenient and economical to treat this coal at the mines. In the eastern fields it is becoming common practice to oil-treat industrial coals for faster, smoother handling.

PROTECTING STOCKPILES

Oil-treated coals in stockpiles retain their burning and coking characteristics. There is better compaction because the bulk density is increased. There is less segregation of the blended sizes in handling, and also less degradation. All these work to retard oxidation, weathering and spontaneous combustion.

BULK DENSITY CONTROL

Oil-treating by-product coal at the mine to control coke quality is becoming more common each year. Although considerable treating is still being done at the coke plants, modern, economical and exacting oil-treating methods have made it desirable to oil-treat at the mines.

By-product coal is a blend of several sizes. By oil-treating the fines only it is possible to get the desired results at a lower cost than treating the entire blend. The average cost of treating by-product coal at the mines by this method is approximately 3½c per ton.

The effect on the bulk density, and the duration of the benefits of oil-treating, are in direct ratio to the moisture content and the size analysis of the coal. From curves run on coals at the coke ovens, oil-treated ¼x0 coal with less than 4% moisture seems to have a permanent bulk density. With the same size and over 4% moisture, the effect of oil on bulk density diminishes with time.

OTHER OIL USES

Oil is being used for other purposes in the newer preparation plants. It is added to slurry water to recover the fine coal as the impurities are thrown off with the water in the centrifuge. Oil froth flotation is another well-known method of fine-coal recovery. Many preparation engineers are experimenting with additional oil applications, which may become standard practices tomorrow.

SELECTING THE PROPER OIL

The question of which grade of oil is best for a particular coal can be answered positively. The character and size of the coal, nature of its moisture content, method of preparation, and destination, handling, storage and use are factors to be considered. One factor, such as inherent moisture, frequently may be the primary one, to be modified by the others in selecting the proper grade of oil. An oil that can be handled easily is often bought rather than the proper grade for effective treating. The reverse is the proper approach.

Viscosity at 100 F is the principal oil specification. For eastern domestic coals for fall and winter shipments, 100 to 200 viscosity oils are satisfactory. Some operators are using 200 to 400 oils for spring and summer shipments because the heavier oil will give more permanent results when these coals are stockpiled during the hot summer months.

High and variable inherent moisture in the central field governs the viscosity of the oil. The rule-of-thumb in this area is to vary the viscosity in accord with the per cent of inherent moisture: i.e., the higher the moisture content the higher the viscosity of the oil applied. Maximum viscosities are in the range of 3,000 sec, and the minimum is 500 sec.

On eastern carbon-sized coal an oil of 100 sec should be used. For lake shipments, eastern nut-slack grades should be treated at 200 to 400 sec. On all-rail shipments to steam and utility plants which are sold on a Btu-delivered basis, the viscosity should be reduced to 100 sec.

The quantity of oil required per ton of industrial coal is determined by the surface area of the prepared size, quantity of material smaller than 10 mesh, and the per cent of surface moisture.

Uniform distribution of the oil on the coal is just as important as the proper grade of oil. If there is a uniform flow of coal over the loading boom, it is comparatively easy to adjust the treating equipment to provide uniform distribution of oil. However, if the flow of coal is intermittent, the quantity of oil should be controlled automatically in accord with the variations in the rate of coal flow.

The true efficiency of the treating installation is measured by its production of uniformly treated coal, satisfied customers and economical use of oil in relation to the specific end use of the coal. Unless variable conditions are corrected and the required adjustments made in the treating equipment, uneven or spotty treatment is bound to result.

GENERAL OIL SPECIFICATIONS

API gravity	15–25
Viscosity	100–3,000
Pour point, winter	−10 F
Pour point, summer	20 F
Flash point	250 F plus
B. S. & W.	0.2%
Color	Dark to black
Odor	Sweet, odorless coal

SELECTING TREATING EQUIPMENT

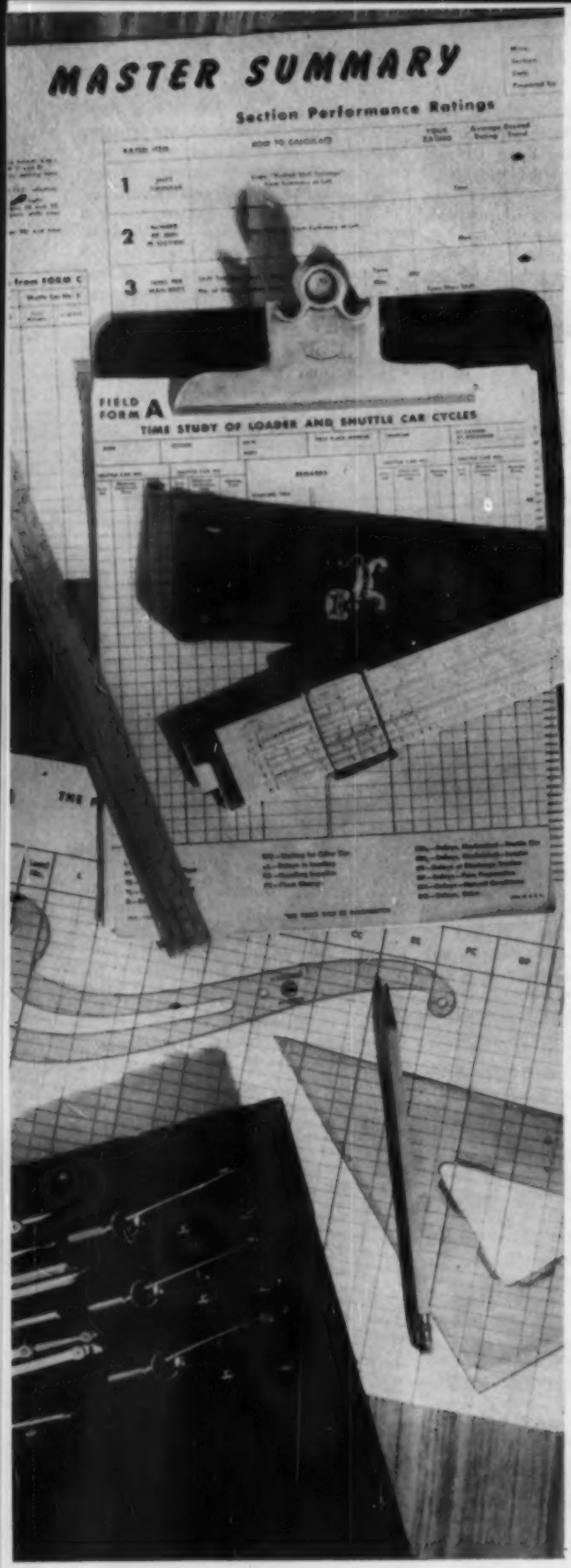
The types of treating equipment in common use are the so-called "hot-oil" and "high-pressure" systems. Either is suitable for treating coals of low and high inherent moisture. However, because of the higher viscosities of the oils used to treat coal with high inherent moistures, the hot-oil system or a combination of hot oil and high pressure is preferable.

The hot-oil system uses heat to reduce the viscosity of the oil to the proper degree, while the high-pressure equipment accomplishes the same result by pressure. With either type it is necessary to have accurate temperature or pressure controls to insure uniform application.

The following table shows suggested application temperatures for oils with viscosities from 100 to 3,000 sec.

Viscosity, SSU, 100 Sec.	Application Temperature
100	100
200	135
300	145
400	160
500	170
600	180
800	190
1,000	200
1,500	210
2,000	225
2,500	235
3,000	240

In this guide to spray-oil application, the authors have tried to point out the reasons for oil treatment and to indicate the proper oil, equipment and methods to insure consumer satisfaction. Though they are the product of extensive research in conjunction with major coal companies the statements are necessarily general, though they can be used as a guide. Field-engineer specialists are available for the solution of specific oil-treating problems.



Industrial Engineering Shaves Costs

Scientific management methods have been adopted by some coal producers as a direct attack on costs once thought unassailable and fixed. Spurred by competition from gas, oil and other coal companies, these producers, among them Jewell Ridge, have evolved successful bases from which the concept of industrial engineering can operate. As a result, standardized operations have resulted in shaved costs.

By E. E. McBURNEY
General Manager, Jewell Ridge Coal Corp.

UNTIL 1935 there were few industrial engineers, as such, in coal mining. This was due to a number of reasons:

1. Hand loaders were paid on a straight piece-rate basis, therefore, a large part of the mine cost was fixed.
2. Management had little confidence in consulting firms who had very limited experience in coal mining.
3. Coal mining was not particularly appealing to some consulting firms because of adverse working conditions, and because of the complexities involved in developing standards.
4. Mine management had not been sold on the benefits derived from industrial engineering.

But, with the advent of mechanization many operators came to realize that scientific management methods were a necessity. Some companies called in management firms to set up methods improvement and cost reduction programs. Others gave their own engineers the responsibility of setting up these programs. In many cases the results were not satisfactory. Standards applications were generally too difficult and required many trained engineers. Further, the engineers assigned to develop the programs were not sufficiently trained in industrial engineering principles. But, because of increasing competition from oil and gas, and from within the coal industry itself, industrial engineering gradually spread throughout the larger companies. As a result the functions below emerged as successful bases from which to operate.

Time Study and Operation Analysis

The first and perhaps most important is time study and operation analysis. This includes a detailed study of each part of an operation to determine the quickest and best method of performance, and a general study of all related operations. It is used as a basis to develop a standard practice for each face operation and general operations, to determine sources of waste in labor and supplies, to analyze crew requirements and establish minimum or most effective crew quotas, and to establish basic time requirements or performance standards.

Performance Standards

Performance standards are used as an index of measurement and are expressed in production per unit of time. Production from each section is evaluated and compared with a standard to indicate inefficiencies or losses in pro-

duction. At Jewell Ridge base standards were developed for ideal physical conditions. Standard allowances were also developed for various degrees of adverse physical conditions, such as grades, top and bottom conditions, off-standard projections and other interferences beyond control of management. For other than ideal conditions, which is usually the case, these standard allowances are applied to the base standards to arrive at the performance standard. Each section is classified weekly by an industrial engineer and performances are computed and posted at each mine.

Cost Budgets

Just as performance standards are necessary as a measurement of production performance, so standard costs, or cost budgets, are a means of measuring cost performance and controlling current costs. Cost control of a coal mining operation based on actual costs is unsatisfactory since it stresses past performance. Instead of showing what the cost should be, it merely attempts to jump the past and yields little information. For instance, if we compare the cost per ton of coal at a mine in two successive periods, we usually find that the totals include many interrelated factors. Some items of expense have risen, others have dropped. But whether they should have been expected to rise or fall is, in some cases, difficult to say. To determine accurately why they changed and how much they should have changed would also be difficult without some fixed value or standard. Flexible budgets were developed at Jewell Ridge mines, which provides control budgets for subordinate responsibilities and operations, and automatic adjustment to compensate for most changes in conditions. Mine cost statements for the month show a breakdown of actual cost by responsibilities, a standard cost for each responsibility, and the difference or variance between actual and standard cost. Mine superintendents and other responsible heads are required to explain each major variance so that the knowledge of their causes can be used as a tool for their reduction.

Supervisor's Bonus Plan

During the past few years, a number of companies have installed various incentive plans for key mine supervisors. It is maintained by a few that if we selected foremen with ambition or with the inherent desire to advance, it would not be necessary to offer extra financial payments in order to attain peak performance. Unfortunately, such foremen are few and far between. Experience indicates that the average foreman will not realize his best potentialities without some kind of extra financial stimulus. The objectives of any bonus plan are to provide supervisors with a knowledge of what is expected of them, to encourage improved performance, to reward in proportion to merit, and to supply management with a yardstick for measuring individual performances. Such a plan should be understandable to the point that foremen can calculate their earnings on a day-to-day basis, irregardless on what period of time the plan is based. The plan should follow certain predetermined rules for it to be completely impartial. It should include, so far as practicable, those factors which the foreman can control. Bouns earnings should be in proportion to performance above a certain level. At Jewell Ridge, foremen and other general mine supervisors participate in a bonus plan on the basis of the mine production performance, the objective cost performance, and the number of shifts worked during the month. The plan provides an opportunity for supervisors to increase their earnings by planning and supervising the work done by their crews in such a manner that the production and cost equivalent of a fair day's work for each employe can be maintained.

These are a few of the industrial engineering functions found in our industry today. Others include salary administration, wage incentives and training programs.

Time and Time Studies

Industrial engineering is not new. At the turn of the century F. W. Taylor presented a paper to the American Society of Mechanical Engineers entitled, "A Piece Rate System." His research into management methods resulted from observations that the majority of his fellow workmen were only 35 to 60% productive. This, he concluded, was due to a variety of reasons, among them: lack of knowledge on the part of supervision about what constituted a fair day's work; lack of information from which to plan the work to be done; lack of training on the part of the workmen, which resulted in much work being done the hard way.

Further research into the ways and means of analyzing each worker's job led to time study as a means of establishing the best method of doing the job and the standard time required to do the job properly.

About the time that Mr. Taylor was completing his first studies, a bricklayer's apprentice named Frank Gilbreth became impressed with the fact that each bricklayer had his own particular way of doing a job. He observed that each worker also had several methods of doing the same job—one that he taught to his apprentice, one that he used when working slowly, and one that he used when working at a normal pace. Gilbreth became interested in the reasons underlying these changes in methods and later established a laboratory to develop the technique of methods study.

As a result of both the Taylor and the Gilbreth studies, various piece rate plans came into existence in the manufacturing industry. However, in several years interest in scientific management began to fade for various reasons:

1. Standards, in some cases, were developed incorrectly by incompetent engineers and serious labor troubles resulted.

2. Management felt that workers should know their jobs without aid of training.

3. Piece-rate workers often produced quantity without regard to quality.

Despite these developments industrial engineering was revived again at the beginning of World War I. The demand for goods was such that management principles were applied to much broader fields and were generally accepted by both management and labor.

Mr. McBurney, the source of this *Coal Age* article, believes that if Taylor and Gilbreth had made similar studies in the coal mining industry as late as the year 1935, their findings, to some extent, would have been the same that existed in the manufacturing industries in the late 1800's—namely, that operations were not standardized, that supervisors did not know what constituted a day's work, and that there was a definite lack of planning and training. Mr. McBurney offered these opinions and a paper on "Industrial Engineering" at the Kentucky Mining Institute in October.

The objective of any industrial engineering program is cost reduction. Some companies have estimated rough savings up to $1 per ton; others have instituted such programs and later discarded them.

Nevertheless, it is the opinion of the author that industrial engineering is absolutely esential to management as a tool for cost reduction. However, certain conditions must be met for the success of any such program.

1. The head of the industrial engineering department must be thoroughly trained in industrial engineering techniques and have a well-rounded knowledge of mining.
2. All echelons of management must be open-minded to changes. Resistance to change has probably caused the downfall of more programs than any other single factor.
3. Programs must have top management's support.
4. Industrial engineers should be carefully selected.

Researching New Hydraulic Fluids

Synthetic fluids and water-oil emulsions are among possible answers to the problem of finding non-flammable fluids for use in hydraulic systems. Here is a report of Bureau of Mines studies on the subject.

By S. P. POLACK, Health and Safety Engineer
U. S. Bureau of Mines, Pittsburgh, Pa.

THE GRADUAL INCREASE in size and capacity of mine equipment utilizing hydraulic pressure has greatly increased the fire hazard. The amount of flammable hydraulic oil taken into the face regions for the operation of machines is great, many machines having a hydraulic oil capacity in excess of 50 gal. Reports covering several recent mine fires involving mining machinery show a definite need for the program outlined in this paper. As proof of this the following quotations have been extracted from three mine-fire reports, (two from the same company), all submitted by our Johnstown, Pa., office during the past 2 yr:

1. Aug. 30, 1954—"On the day of the fire, the shuttle car was nearly loaded when a flash was observed between the cable reel and the left rear wheel. The pump motor was the only motor energized at this time . . . The fire was fought effectively with water from a hose line from a nearby pump. During the fire, the main hydraulic line on the shuttle car ruptured, and the hydraulic oil contributed greatly to the duration of the fire . . ."

2. Jan. 31, 1956—"The fire started when a short circuit occurred in a rubber-covered multiple-conductor cable between the controller and the cutting motor. The resulting arc burned and ruptured a hydraulic hose and ignited the hydraulic oil escaping from the hose . . ."

3. Feb. 28, 1956—"The fire started when a short circuit occurred near the center of the cable between the cutting motor and the connection box, and the resulting arcing ruptured hydraulic hoses and ignited hydraulic oil escaping from the hoses . . ."

In all three cases the hydraulic fluids used were derived from petroleum. Such fluids are inherently flammable and therefore present a potential hazard characteristic of such hydrocarbons.

In a conference held by Bureau of Mines Health and Safety personnel it was decided that if this ever-increasing hazard is to be eliminated, or at least reduced, a concerted effort must be made to reach a clear understanding of all the problems that would be involved in a campaign intended to minimize the dangers.

The following preliminary plan of action was adopted:

1. To make a survey to determine (a) the approximate consumption of hydraulic fluid and the relationship between this consumption and the coal produced, (b) the characteristics and prices of the presently used hydraulic fluids, and (c) the number of machines and hydraulic oil capacity involved.

2. To survey the presently available fire-resistant hydraulic fluids as to characteristics, price and availability for coal mine use.

3. To inquire into the possibilities of developing a fluid that will, as nearly as possible, give the same results as the presently used petroleum products and, simultaneously, offer fire-resistance without increasing the cost beyond the industry's ability or willingness to pay for this protection.

TABLE I—Hydraulic-Fluid Use at Mines Surveyed

USBM Office	Number Mines Surveyed	Number Employees	Hydraulic Fluid Used, Gallons	Tons Coal Produced	Tons Per Gallon
Pittsburgh, Pa.	71	21,317	1,544,480	24,233,091	15.69
St. Clairsville, Ohio	32	5,106	23,589	866,725	36.74
Birmingham, Ala.	19	5,825	110,217	4,296,400	38.98
Johnstown, Pa.	31	7,487	101,447	3,128,769	30.84
Norton, Va.	91	11,543	77,510	2,496,451	32.21
Barbourville, Ky.	39	5,150	74,039	3,103,219	41.91
Seattle, Wash.	5	341	1,140	47,452	41.62
Vincennes, Ind.	49	12,020	150,159	7,596,197	50.59
Morgantown, W. Va.	68	9,781	161,345	4,098,997	25.41
Mt. Hope, W. Va.	201	36,594	947,814	29,964,879	31.61
Denver, Colo.	63	4,642	300,662	7,716,212	25.66
Jellico, Tenn.	9	951	3,155	547,125	173.42
Total	678	120,757	3,495,557	88,095,517	25.20

*Quantities obtained on either weekly, monthly or yearly basis, whichever was easiest for mine operator to furnish. The quantity of fluid is that required in producing the corresponding tonnages.

SURVEY RESULTS

The Bureau of Mines survey to determine the quantity and type of hydraulic fluid used in the operation of mining equipment has progressed sufficiently for a preliminary tabulation. Reports submitted by 12 district and subdistrict offices of the bureau cover 14 bituminous-coal-producing states. A total of 678 coal mines was surveyed; 619 of these employed 15 or more men and this constitutes 46.3% of the mines employing 15 or more in the states surveyed and approximately 45% of the 1,369 Title II mines in the United States.

Abstracted from a paper at the 1956 Congress of the National Safety Council, Coal Mining Section.

TABLE II—Equipment Using Hydraulic Fluid at Mines Surveyed

USBM Office	Number Mines Surveyed	Number Employess	Cutting Machines	Loading Machines	Drills, Roof-Bolters, Timbering Machines	Shuttle Cars	Continuous Miners	Hoists, Car-Spotters, Compressors, etc.	Total Units
Pittsburgh, Pa.	71	21,317	546	685	248	530	124	93	2,226
St. Clairsville, Ohio	32	5,106	72	151	87	129	15	6	460
Birmingham, Ala.	19	5,825	83	129	71	187	7	83	560
Johnstown, Pa.	31	7,487	115	182	59	253	61	32	702
Norton, Va.	91	11,543	134	328	111	389	...	7	969
Barbourville, Ky.	39	5,150	55	153	23	163	...	14	408
Seattle, Wash.	5	341	...	2	...	...	6	..	8
Vincennes, Ind.	49	12,020	230	300	201	521	12	37	1,301
Morgantown, W. Va.	68	9,781	207	326	260	325	25	21	1,164
Mt. Hope, W. Va.	201	36,594	481	978	246	1,036	58	151	2,950
Denver, Colo.	63	4,642	127	200	108	209	9	23	676
Jellico, Tenn.	9	951	12	21	1	11	...	..	45
Total	678	120,757	2,062	3,455	1,415	3,753	317	467	11,469
Hydraulic-system capacity—range in gallons	..	.....	20–90	7–50	15–100	5–30	33–180	10–40	.....

TABLE III—Estimated Annual Use of Hydraulic Fluid at Mines Surveyed

USBM Office	Number Mines Surveyed	Number Employees	Hydraulic Fluid Used, Gallons	Tons Coal Produced	Tons Per Gallon
Pittsburgh, Pa.	71	21,317	3,021,253	46,087,667	15.25
St. Clairsville, Ohio	32	5,106	364,988	13,710,582	37.56
Birmingham, Ala.	19	5,825	362,812	10,980,000	30.26
Johnstown, Pa.	31	7,487	444,992	11,318,450	25.44
Norton, Va.	91	11,543	894,021	28,370,480	31.73
Barbourville, Ky.	39	5,150	236,307	11,516,036	48.73
Seattle, Wash.	5	341	13,154	547,500	41.62
Vincennes, Ind.	49	12,020	977,026	42,989,710	44.00
Morgantown, W. Va.	68	9,781	1,120,565	32,110,321	28.66
Mt. Hope, W. Va.	201	36,594	2,540,871	82,142,128	32.33
Denver, Colo.	63	4,642	332,017	9,646,394	29.05
Jellico, Tenn.	9	951	17,331	2,457,152	141.78
Total	678	120,757	10,325,337	291,876,420	28.27

The 678 mines surveyed (Table I) employed 120,757 men and produced 88,095,517 tons of coal during a period in which 3,495,557 gal of hydraulic fluid was used in 11,469 units of mining equipment. Many of the units had a capacity of more than 50 gal of hydraulic fluid, as shown in Table II. The survey indicates that 1 gal of hydraulic fluid is used for each 25.2 tons of coal mined. A projection of the data to estimate yearly consumption, based on a 50-wk operating period, indicates that the mines surveyed would use 10,325,337 gal of hydraulic fluid and produce 291,876,420 tons of coal, or 28.27 tons per gal used (Table III). This quantity of fluid would cover more than 1,000 mi of 12-ft entry to a depth of ¼ in.

It therefore is reasonably safe to assume that in mining 300 million tons of coal by mechanical means, more than 10 million gal of hydraulic fluid would be consumed. Since the industry hopes to double coal production within 10 yr, the amount of hydraulic fluid required would also be so increased, unless radical changes in design and maintenance of equipment are instituted. All fluids used in the mines surveyed were petroleum products and therefore flammable.

A scrutiny of the survey data and other information obtained from mine operators, equipment manufacturers and producers of hydraulic fluid indicated that such fluids are purchased on the basis of price rather than scientific determination as to the quality of the fluid for safe and efficient use. It has been reported that during the period when the equipment is under factory guarantee the proper fluid as recommended by the manufacturer is used. At the expiration of the guarantee period, price generally becomes the chief consideration. This is not a theoretical statement; it was arrived at after a careful study of the specifications and price range of the hydraulic fluids recommended by the manufacturers of mining equipment and the information received at the mines during the survey.

Since hydraulic systems are closed and the amount of additional fluid required after the system has been filled should be relatively small in the opinion of the manufacturers, we can conclude from the survey and from statements by operators and oil distributors that leakage is a major factor in the consumption of hydraulic fluid.

The following information was included in the literature provided by one of the major oil producers:

"When hydraulic systems leak excessively, some users merely change to a lower-quality, lower-priced oil and let the leakage continue. This practice increases the cost of hydraulic fluid, and although a low-quality oil is used the additional cost for oil can easily amount to over $25 a year for even a small machine. Although this may appear small, it means $2,500 a year in a plant with many machines. Large systems sometimes leak as much as several barrels of oil a day. In one large system, which was known to leak 4 to 5 bbl a day, the cost of oil was about $100 per day even with a low-quality oil in service. But the extra cost of oil is often the least important disadvantage of continued excessive leakage."

A bureau study of the flammable characteristics of the petroleum-type hydraulic fluids used and available discloses a range of more than 200 F between high and low flash and fire points and also shows that when such fluids are ignited they all propagate flame. While there are no universally accepted standards for fire-resistant hydraulic fluids, tests have been established by individual groups and are used to judge fluids which are offered to industry as fire-resistant. Effort now is being made by the American Society for Testing Materials to have

such tests standardized and also to make the tests more applicable to the conditions under which such fluids are used.

SYNTHETIC FLUIDS

A description of presently available fire-resistant fluids follows:

Straight Synthetic Fluids—This class of hydraulic fluids comprises the phosphate-ester and chlorinated-hydrocarbon compounds, which are designed as nearly as possible to duplicate the properties of petroleum oils. Users report that these products although somewhat inferior to high-quality petroleum oil, will provide fully satisfactory performance in the hydraulic elements of mining equipment operated underground. However, experienced advice should be sought in the selection of hoses, rings and seals, as some materials used in manufacturing these are adversely affected by the fluids. These fluids cost approximately $3.50 per gal.

Water-Base Synthetic Fluids—This class of fire-resistant hydraulic fluids comprises essentially mixtures of water, polyglycols and additives. The mixture is factory-made. Users report that the products, comprising 30 to 40% water, are stable at temperatures of 140-150 F maximum, but must be checked occasionally to maintain the water and additive content at prescribed levels. A study of these products indicates they can be expected to perform satisfactorily in mining equipment under most conditions. They are compatible with the seals, packings and hoses normally used. However, in common with the straight-synthetic fluids, they have a tendency to "lift" the paint in reservoirs. These water-base fluids cost approximately $2.50 per gal. Should the use of fire-resistant hydraulic fluids increase substantially, it will be reasonable to expect a decrease in price.

The possibility of dehydrating the water-base fluids prior to shipping and storage and adding the water when ready for use by consumers has been discussed by the bureau with representatives of producing companies. This should lower the price.

Water-Soluble Oil Emulsions—There are two basic types; oil-water and water-in-oil. Their use as hydraulic fluids has been explored during recent years, but so far no thought or tests have been given to such fluids for use in mining machinery.

Water-soluble oil is generally a petroleum product to which an emulsifying agent has been added. It is used in conjunction with water. The amount of oil is normally far less than the amount of water, thus making fire-resistance possible. In addition to being a quenching agent, water when turned into steam also is a "snuffer" in case of fire.

Water-in-oil emulsions are relatively new. In this type, a globule of water is forced into a globule of oil. The oil, being on the outside, furnishes a certain amount of the lubricity that is required to keep the hydraulic pumps operating properly and economically, because the pumps in most instances depend on the hydraulic fluid for self-lubrication. Several producers are now working on this fluid. One is already on the market at approximately $1.25 per gal.

This fluid has been used in industrial machinery with goods results, but as far as is known no tests have been made under actual operating conditions in coal mining. However, the following excerpt from a letter report sent the bureau by a gear-pump manufacturer illustrates the results of a test made by them.

"Referring to your question regarding emulsions, we ran a laboratory test on a pump using a 'water-in-oil' emulsion. The pump was a type in which the inside of the pump case is not filled with oil so there is considerable place for rust to develop if moisture should be present. After 250 hr of operation at the rated pressure of 2,500 psi and a temperature of 110 F [equivalent to more than 1 yr of normal operation in the opinion of one hydraulic engineer], an extreme amount of rust was observed inside the pump casing and on the bottom of the pump casing, including the part of the reservoir which was above the oil level. While the pump did not show marked increases in leakage during this time it was obvious that the ball bearings, control functions, and general utility of the pump would soon be completely destroyed so the test was discontinued."

The makers of this fluid, which is about 50% water, feel that in addition to fire-resistance this fluid has other qualities that should make it acceptable. Cost is one. This fluid can, by the addition of additives to counter adverse conditions, be tailored to most uses in coal mines. However, experimental work is needed to confirm the aforesaid claims and to determine whether pump starvation will result.

Oil-in-water emulsions are made by surrounding globules of oil with globules of water. Therefore, the water is on the outside offering less lubricity than other commonly used or recommended fluids. This fluid is milky in color and is mixed with water in ratios wherein the oil is only 2 to 3% of the total. Fluids of this type are commonly used in hydraulic systems employing triplex plunger pumps, but it appears that at the aforementioned ratios they do not have the film strength required to protect the kind of pumps commonly used in coal-mine-equipment hydraulic components which are designed for oil.

This matter has been discussed with numerous hydraulic and lubrication engineers employed by producers, manufacturers and users, and the consensus is that the possibilities of this fluid should be explored. The manufacturer of one of the commonly used hydraulic pumps stated that equipment could be designed to use oil-in-water emulsions, but it would require thought and experiment.

The prospect of increasing the oil ratio to about 20% has been explored by the Bureau of Mines, and in a discussion between bureau representatives and members of a leading oil company's research staff, it was agreed that this ratio, 4 to 1 (water-to-oil), may provide sufficient lubricity to make the product acceptable.

Since the water-soluble oils cost about $1 per gal, the emulsion would be about 20c per gal, or half of the present cost of flammable oils. This feature was also discussed by the bureau with hydraulic engineers employed by prominent equipment manufacturers.

As a result of these discussions, the bureau feels it advisable to conduct pilot experiments where oil producers, mining equipment and pump manufacturers, and mine operators would, on a cooperative basis, perform the necessary tests and trials. Some have the test equipment. Others would furnish the pumps and necessary gear and evaluate the results. However, industrial representatives have suggested that the bureau should initiate the program. No decision has been reached at this time. However, should pilot tests be made and should they prove that the oil-in-water emulsions are practical, agreements could be written to include other oil producers and mine equipment and pump manufacturers. Because there are at least three tyeps of oil pumps (gear, vane, and piston), tests should include all such devices.

The soluble oil is produced by all leading refiners, and procurement offers no problem.

Preliminary work accomplished by the Bureau of Mines should justify efforts by oil producers, equipment manufacturers, mine operators, and state and federal inspection agencies to carry on as diligently as possible any necessary tests to aid the development of hydraulic fluids that will reduce the hazard from fire and at the same time be economically acceptable to users.

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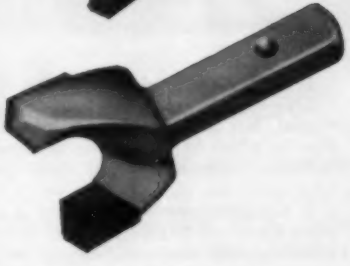

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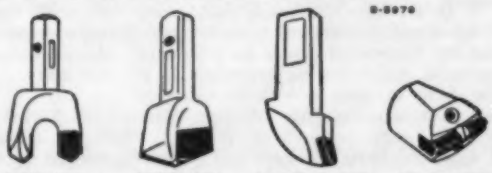

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FOREMEN'S FORUM

What Executives Look For In Selecting Foremen

Here are some of the qualities and skills your superiors saw in you when they selected you for your job. Are you keeping up with their first appraisal of you?

By ERNEST W. FAIR
Boulder, Colo.

SECURING the best individual for the job to be filled is always important. Hit-or-miss selection nearly always overlooks the man who has most to contribute. The situation in the coal industry today makes it imperative that the best man be found for every supervisory position.

Coal's executives are well aware of this, assuming equal technical proficiency among candidates. They have, through experience and counsel, set up standards to guide them in selecting supervisors and department heads at all levels. A survey shows that the following attributes in a candidate are important and are carefully weighed.

1. Absolute company loyalty—No individual can deliver at maximum efficiency without full and complete loyalty to the firm for which he works. This is topmost on the executive's list.

2. Cooperativeness—There was a day when the ability to give and take, to work smoothly with others and to rely on cooperation in getting things done were not so necessary, but that day is gone forever. To secure maximum results, the good supervisor today must be able to take as well as to give orders.

3. Originality—This quality enables one to figure out the best way to do his work, and not to proceed chiefly on a basis of imitation and following precedent. It is the ability to come up with the idea that sets patterns rather than following them.

4. Ability to coordinate—Good supervision calls for not only the ability to direct the work of employees but also to coordinate efforts with superiors. Where foremen possess this trait, the work flows smoothly.

5. Sociability—Getting along with others is a natural instinct some people possess and others do not. It enables a supervisor to size up situations quickly, not only as they affect the job to be done, but as they affect the people who are to carry out the details.

6. Success in personal life—The man with a mixed-up personal life seldom achieves any degree of success in even the most minor supervisory role. Those of us who cannot solve our personal problems seldom possess the ability to solve the more difficult problems that are a part of every supervisory position.

7. Judgment—This is most important. Good judgment is evident in the common sense a man uses in handling the everyday problems of the job he now has. To a certain extent this assures the appraising executive that such a man could render decisions in a supervisory spot without delay.

8. Verbal facility—A good command of words, often overlooked but very important, is necessary in a good supervisor. The man who can speak with clarity and put together words and phrases so that their meaning is beyond any doubt is always assured of more accurate compliance from those who carry out the details.

9. Evidence of self education—The employee who shows positive efforts to improve his present status can be counted on to do the same in the future. He is better prepared to handle a supervisory position.

10. Aggressiveness—The persistence to see any problem through to a conclusion is a necessary quality. The individual who shows little sign of this type of aggressiveness is unlikely to show any in the future.

11. Balance in associates—Having too many enemies is a sign of weakness, but a good candidate will seldom be without some detractors if he possesses the other qualities a good supervisor should have. "He would be an excellent man . . . hasn't an enemy in the world," is a very nice compliment but somewhat impractical when it comes to selecting foremen.

12. Humor—The good supervisor is never a wise-cracking, joke-telling character, but he definitely has a well-developed sense of humor. It helps relieve the tense situations he must handle.

13. Experience—Experience in the field or in the job can never be left out no matter how many other fine qualities the candidate may have. Otherwise the company would have to wait patiently while the experience is acquired, and that can be costly. (*Continued on next page*)

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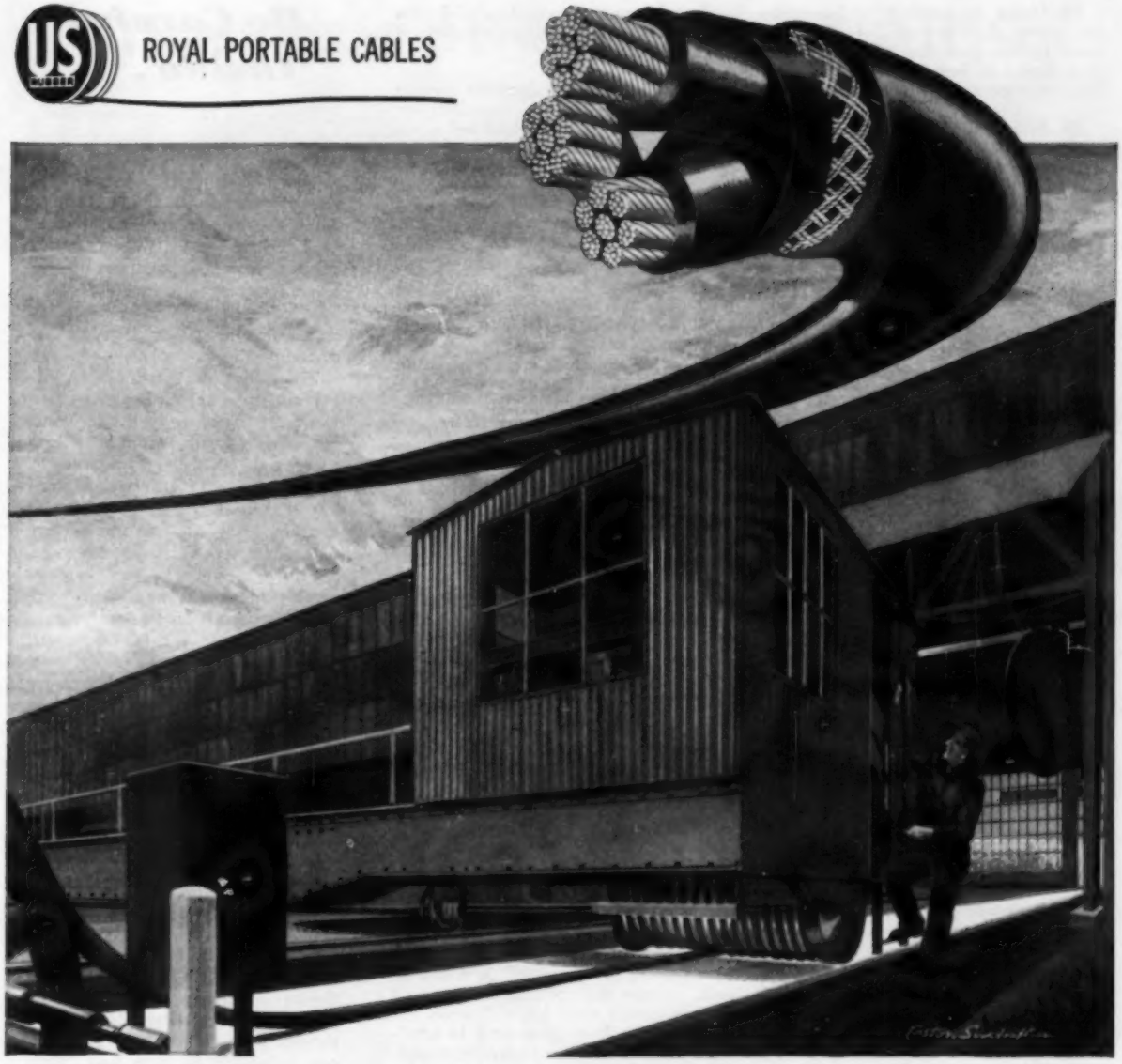

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14. Desire to excel—This determines the quality of job performance. It is indicated by the goals the individual seeks. It is shown in how his aspirations give him the drive needed to do the job.

15. Self-confidence—Making up one's mind decisively and promptly inspires the same reaction among those who must carry out the details. Lack of it leads to loss of respect among subordinates.

16. Lack of prejudices—This is a world loaded with prejudices of all kinds. The good supervisor has to work with all of them. He can never get the most from his crew if he is held back by his own prejudices on race, creed, religion or anything else.

17. Liveliness—Working hard and playing hard indicates that the candidate has the energy and vitality to handle tough and exacting assignments.

18. Knows the job he now has—Top performance in a new job cannot be expected from the man who has failed to conquer the problems of his present position. The same lack will show in the new position every time.

19. Good health—When other qualities among candidates are equal, this is a good one upon which to base a selection. The man who possesses good health and who works at keeping it can be depended upon to have the physical equipment he will need in the future.

20. Seldom reverses decisions—Results in any firm come when supervisors are sure of their orders and plans and members of the staff know that they will be followed through. Overhead costs rise when the staff cannot be sure that supervisory decisions will stand.

21. High frustration tolerance—Even temperament is a basic requirement. The man who can tolerate nothing but perfection all the time seldom attains the overall results desired by any progressive firm.

22. Appearance — Good supervisors need not be movie stars, but they should be the type of people who give attention to their personal grooming. It inspires respect from others.

23. Emotional balance—Possession of this quality is always to be desired. The man who can win without exulting and lose without moping always has a smoother functioning department.

24. Works harder and longer than others—The man who does only what is required to hold onto his present job seldom has the makings of a good supervisor. The one who works harder and longer can be depended upon.

Waste Not, Want Not

THERE SEEM TO BE infinite ways of wasting energy, space, material and time. Possible causes of leaks and losses may be divided into six classes: (1) managerial methods; (2) working force; (3) building, equipment, tools and machinery; (4) production, (5) material and (6) receiving and shipping.

Each factor may be broken down into many divisions. Take material, for example. It is wasteful when the right material is not used for a given job. This may result in an inferior product, or it may leave some other job short of the material designed for it. The degree of waste is measured by the difference between the utility actually furnished by an economic good and the maximum utility it is capable of furnishing.

Every supervisor should interest himself in this means-end relationship. Look around to see how much of what is done is necessary to your purpose, then determine whether it is being done in the best way. How much sheer carelessness is at the bottom of waste—carelessness not only in workmanship but carelessness, too, in regard to what is necessary and what is surplus expenditure of money, time, energy, space and material. Are people working in the right direction to achieve your desired ends? Is effort duplicated?

Nothing provokes the tidy-minded executive quite so much as the needless use of energy. Sir Isaac Newton set forth some "Rules of Reasoning" in which he said, "Nature does nothing in vain, and more is in vain when less will serve."

Everything from paperwork to erecting a plant, offers opportunity for expending too much energy, too much time, too much material. One need not choose a strong prop to support a light burden, or build a bridge much wider than the road. There is an economic law of diminishing returns. After a certain point has been reached the application of labor and capital fails to cause a proportionate increase in the value and return.

The foreman seeking to reduce waste will ask himself how much of the activity he sees is merely the movement of things from one place to another; how much of the bustle is only the shuffling of materials. It is what goes out of the door in the way of finished product that counts.

It is waste, said Aesop, when great activity produces small result. You will recall his fable: A mountain from which were heard to proceed dreadful groans, was said to be in labor, and people flocked near to see what would be produced. After waiting until they were quite tired, out crept a mouse.

—Excerpted from the monthly letter of the Royal Bank of Canada

Be Careful Inside . . .

Firebosses and supervisors who examine coal mines for explosive gas and other dangers are themselves becoming victims of the hazards they seek to detect. Officials of the Bureau of Mines report that several deaths have resulted recently because, instead of walking through inactive areas, bosses have ridden nonpermissible trolley locomotives and jeeps into such workings.

The most recent incident occurred July 12. A foreman in a Kentucky mine was killed when he rode a small locomotive into an area that had been inactive for months. The operator was injured but survived, and 28 men in another part of the mine were placed in jeopardy. In Alabama, May 31, a fireboss and another employee riding with him were killed while on an inspection trip in an inactive area. The record also shows that a Pennsylvania fireboss was killed in a similar accident in 1954, and one was killed and two injured in West Virginia the year before.

...And Outside

Vehicles also are involved in a common winter hazard outside—but a different type of vehicle and a different hazard, to wit: automobiles and skidding on snow and ice. So, as the National Safety Council's Committee on Winter Driving Hazards so aptly notes: "It's up to you." They offer the following to help you "Quit your skiddin'!"

1. Have good tires, use tire chains. But even with snow tires or the greater help of chains, slower than normal speeds are a must on snow and ice.

2. Keep windshield and windows clear. Be sure that your wiper blades, heater and defroster are operating properly.

3. Get the "feel" of the road. Try your brakes to determine road condition and adjust speed to weather and road conditions.

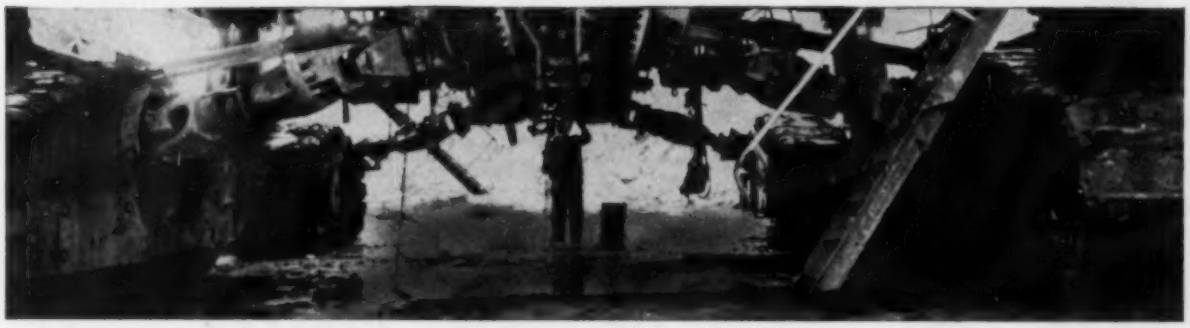
4. Follow at a safe distance. If you're back you have a better chance of stopping. You must be even farther back when it's slippery.

5. Pump your brakes when you want to stop. You keep traction and reduce the chances of skidding.

In every phase of mining

FOR MINE CARS AND ENGINES, Cities Service produces a complete line of highest quality lubricants, specially tailored for rugged, dusty mine operation. Properly applied, these oils and greases can substantially cut haulage costs. . . . Mighty important when you consider these costs now run 20-40% of the total cost of a mine operation! Get the details without obligation from a Cities Service Lubrication Engineer.

Cities Service Lubrication



FOR STRIP EQUIPMENT, nothing surpasses Cities Service Trojan Gear Oils and C-300 Motor Oils. Gears of world's second largest shovel undergo Cities Service treatment. Many strip miners simplify application and inventory with multi-purpose Trojan H Grease. Ideal for bearings, water pumps, all chassis lubrication.

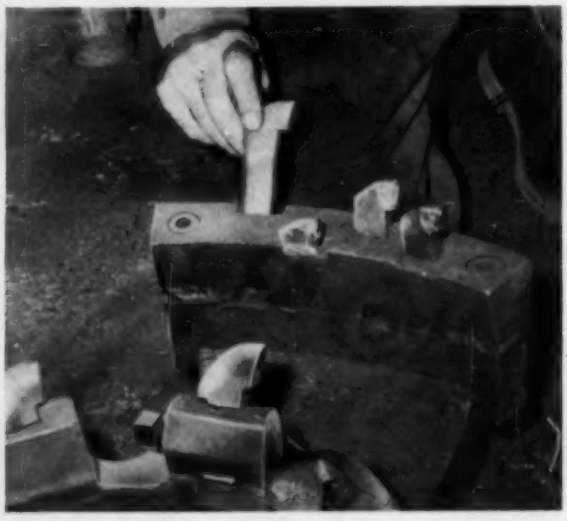
conveys better results!

CITIES SERVICE OFFERS a complete line of lubricants for maximum protection of bearings, belts, trolleys. One major conveyor manufacturer uses only Cities Service lubricants for bearings—scores of miners do the same!

CITIES SERVICE

A complete line of lubricants for every mining need and condition

OPERATING IDEAS



Wedge-Type Bits and Holders Slash Bit Cost

WEDGE-TYPE BITS and bit holders have slashed bit costs by more than 10¢ per ton at the Enoco Collieries, Bruceville, Ind. A 50% reduction in bit-changing time also provides added valuable production time.

Mining is in the hard Indiana No. 5 seam, which contains streaks of pyrite. Cutting is difficult and bit cost ran rather high until the wedge-type holders and tapered bits were installed on the Colmols. Bits in the outer holder position on the rotating arms of the Colmol were largely responsible for the higher cost. Bit speed is highest in the outer holders and bit punishment more severe.

Because of the severe cutting conditions, trouble was experienced with the set screws holding the bits. To find a way to eliminate this trouble, the company experimented with a bit that could be wedged into place. Various degrees of taper for bits and holders were tried and tested in the mine. Tests led to the development of 5- and 6-place bit holders and the Kennametal U7T bit.

In addition to lower bit cost, bracket trouble has been reduced at least 90%. According to John Stachura, general superintendent, the taper-shank bits are more firmly and more accurately held in the block. Therefore they cut more accurate clearance and reduce wear on the bit holders.

Bit changing is fast and easy with the U7T bit. The workers like to work with the wedge-type bits and since so little effort is required they keep sharp bits in the machine.

BIT COSTS PER TON

	Set-Screw Bits 1955	Taper-Shank Bits 1956
April.....	12.5¢	2.1¢
May.....	17.6	5.2
June.....	15.9	5.5
July.....	26.2	5.2
August...	....	3.9

Semi-Automatic Method Speeds Welding

FASTER AND EASIER hard-facing is possible with the use of a semi-automatic hard-facing method. Some of the features found in the method include deposition rates as high as 20 lb per hr, open-arc welding with no flux, complete visibility of the arc, no stub end losses, no time wasted in changing electrodes, lightweight equipment that is easy to handle, and hard-facing and build-up wires for every purpose.

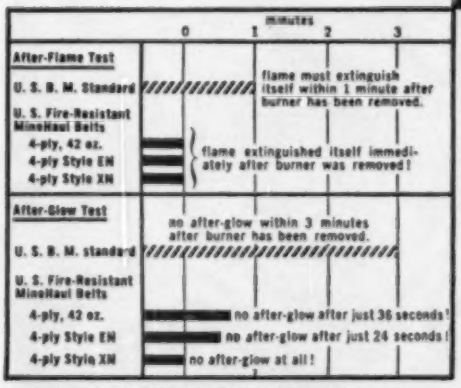
The semi-automatic welding machine is essentially a simple device to feed a continuous coiled wire through a flexible cable to the welding nozzle. The Stoody Co. reports that wires of small diameter are used in this process and deposit weld metal at a greatly increased rate over large wires at any given amperage. All standard semi-automatic welders can be easily and inexpensively converted to the Stoody fabricated wires, according to The Stoody Co.

These products, first made available by Stoody about 2 yr ago, are available in a number of different analyses designed for all types of build-up and hard-facing applications. Users are said to find that hard-facing jobs ordinarily done by manual welding are turned out easier and faster. The semi-automatic system combines the versatility of the old fashioned method with the speed of automatic feed.

Fire-Resistant MineHaul Belt

MEETS and EXCEEDS all existing fire-resistance regulations

Comparison of U.S. Fire-Resistant MineHaul Belts with standards as set forth in United States Bureau of Mines Schedule 28*


minutes
0
1
2
3
After-Flame Test
U. S. B. M. Standard
flame must extinguish itself within 1 minute after burner has been removed.
U. S. Fire-Resistant MineHaul Belts
4-ply, 42 oz.
4-ply Style EN
4-ply Style XN
flame extinguished itself immediately after burner was removed!
After-Glow Test
no after-glow within 3 minutes after burner has been removed.
U. S. B. M. standard
U. S. Fire-Resistant MineHaul Belts
4-ply, 42 oz.
no after-glow after just 36 seconds!
4-ply Style EN
no after-glow after just 24 seconds!
4-ply Style XN
no after-glow at all!

*as tested in United States Rubber Company laboratories in accordance with Bureau of Mines test specifications.

Testing these belts in U. S. Rubber's own laboratory—*in accordance with Bureau of Mines specifications*—it was found that U. S. Fire-Resistant MineHaul Belts not only meet but EXCEED all existing fire-resistance standards (see chart to left).

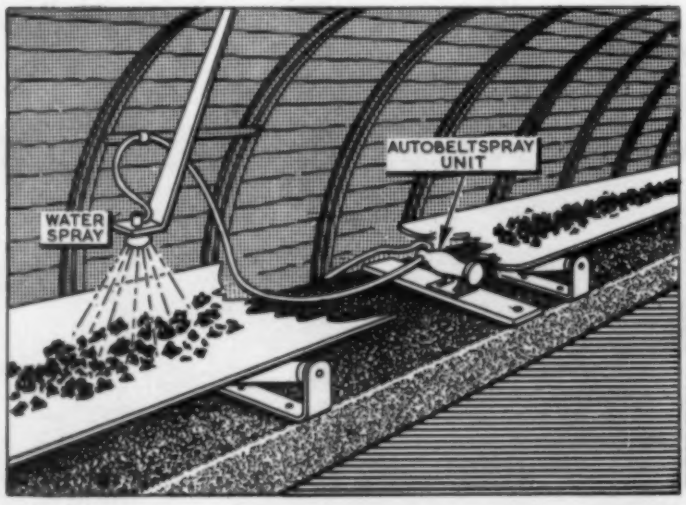
These new belts have been given the Bureau of Mines acceptance designation: "Fire-Resistant, U.S.B.M. No. 28-5."

U. S. Fire-Resistant MineHaul Belts combine maximum fire safety with all the qualities you've come to expect in a "U.S." belt: optimum troughability, high impact resistance, outstanding rip resistance, excellent fastener-holding ability, added edge protection, mildew resistance—to name a few.

Obtainable at the 28 "U.S." District Sales Offices, at selected distributors, or write us at Rockefeller Center, New York 20, N.Y.

Mechanical Goods Division

United States Rubber



Belt Spray Operates Automatically

AUTOMATIC DUST SUPPRESSION on belt conveyors is possible with a new device developed in Lenton, Nottingham, England. The unit was developed because of the need for a reliable automatic method to suppress dust. Ideas from the National Coal Board officials and specialists of Conflow, Ltd. were incorporated in the "Autobeltspray" device, according to a recent issue of *Colliery Guardian*.

The "Autobeltspray" automatically stops or starts the flow of water to a spray over the belt conveyor, depending on whether or not there is coal on the belt. The unit is located beneath the carrying side of the belt conveyor midway between the sets of troughing idlers. It is adjusted by a simple setcrew so that the driving pulley of the device barely avoids contact with the belt.

Even with a light load the belt is depressed enough to contact and revolve the drive pulley. This causes oil to be pumped inside the unit and operate a piston which opens a water supply valve. Water then flows to the spray over the belt. The supply valve is closed instantly when the driving pulley stops running. One revolution of the driving pulley ensures that the water is available to the sprays.

The device is suspended on a depressible spring-loaded arm which is designed to collapse under an excessive load. Any belt speed will drive the unit and water pressures up to 1,200 psi can be used. Water is carried to and from the valve by ½-in hoses. The compact control is 5¼x10½x9 in and weighs only 16 lb.

Cage Protects Against Tire Blowout

PROTECTION against injury by a flying rim is provided by this tire cage. Before a tire is inflated it is rolled into the position shown in the left photo. If the rim should be blown off as the tire is inflated the worker would not be hurt. To fill a large tire that is too large for the cage, the worker merely places himself behind bars (right). The safety cage is made up of sections of pipe welded to a steel base and occupies a minimum of space.

With 2¼-cu yd bucket, the TD-14 puts a 12-ton load of coal on a truck in a matter of minutes. Without "overdoing" operator or equipment, this size of Skid-Shovel can easily load up to 135 tons of "shot" coal per hour —in average conditions.

HOW INTERNATIONAL DROTT TD-14 SKID-SHOVEL

adds cost-cutting mobility to coal-stripping!

—for Howard Coal Company, Caryville, Tennessee

Here's what Lee Powers, partner in Howard Coal Company, Caryville, Tennessee, says about the firm's TD-14 Skid-Shovel performance:

"Pry-action and bucket roll-back of the Skid-Shovel give work-speeding digging force. Maneuverability is a big feature, too. The TD-14 can go where a (boom-type) power-shovel can't reach."

Exclusive International Drott *triple-power pry-action break-out*—plus 42° ground level roll-back—gives you amazing "slate-shattering" digging force, and bucket-heaping action. Exclusive shock-swallowing Hydro-Spring protects the equipment—adds operating comfort!

And quick, *go-anywhere* all-weather traction teams with positive, easy, "turn-on-its-heel" maneuverability.

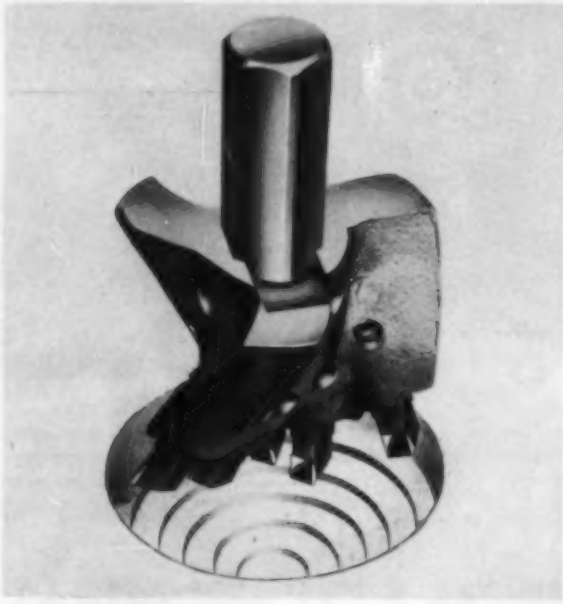
That's why this International Drott TD-14 Skid-Shovel, for example, is an ideal "help-out" unit for big dozers and big dippers—besides providing a big-capacity coal-loading unit.

See for yourself how an International Drott can often outspeed, outreach, and outproduce boom-type equipment. Look at the exclusive International Drott Four-In-One—now available in four sizes, 1-yd to 3-yd capacity. Note how the Four-In-One gives you 4-machine utility: *bulldozer, Bullclam, clamshell,* and *Skid-Shovel*—for one moderate investment. Ask your International Drott Construction Equipment distributor for a demonstration!

International Harvester Company, Chicago 1, Illinois
Drott Manufacturing Corp., Milwaukee 15, Wisconsin

INTERNATIONAL® DROTT®

EQUIPMENT NEWS



Drag Bit Drill Head

A drag bit drill head that reportedly speeds blast hole auger drilling, thus cutting costs, is being manufactured by the Austin Powder Co., Cleveland, Ohio. Designated Model AP, the drill head is a three-wing prop type designed for use with special, patented carbide-tipped bits. The bits are designed with tapered shanks that drive-fit in the drill head. Wedges and set screws are not needed, the manufacturer says, and bits can be removed with a hammer and a punch. Because the head and bits act as a unit, the Model AP reportedly cuts faster than ordinary drill heads with rotating bits. Manufactured in five sizes for cutting holes from 4¾ in to 8¾ in in diameter, the Model AP is recommended for use in all types of sandstone and other fine rock found in coal mining, road construction and seismograph work.

Off-Highway Truck Line Expanded

International Harvester Co., 180 No. Michigan Ave., Chicago 1, Ill., has expanded its line of "all-wheel drive" trucks by adding four six-wheel drive and two four-wheel drive models. In the six-wheel drive versions the company is manufacturing the SF-170 (photo) with a gross vehicle weight rating of 22,000 lb; the SF-172, gvw 26,000 lb; the SF-180, gvw 30,000 lb; and the SF-182, gvw 33,000 lb. The four-wheel drive models are the S-170 with a gross vehicle weight of 19,000 lb, and the S-180, with a gvw of 20,000 lb. Designed for off-highway operations, the trucks are offered with standard gasoline engines or as LPG-fueled versions. With the additions the International line of "all-wheel drive" trucks includes 10 models with gvw ranging from 7,000 lb to 33,000 lb.

1-Yd Crane-Excavator Introduced

The 30-B, a 1-yd crane-excavator convertible to shovel, dragline, clamshell, crane and dragshovel, has been introduced by the Bucyrus-Erie Co., South Milwaukee, Wis. Offered with five sizes of crawler mountings, the 30-B is also available as a carrier-mounted Transit Crane rated at 35 tons. The main operating functions of the 30-B are air controlled. Buyers can choose among diesel power with direct drive or torque converter drive, gasoline engine with direct drive, and electric motor. The Transit Crane is offered with gasoline engine and direct drive as standard equipment. As a crane the 30-B takes 100-ft boom, plus 10-, 20-, and 30-ft jibs.

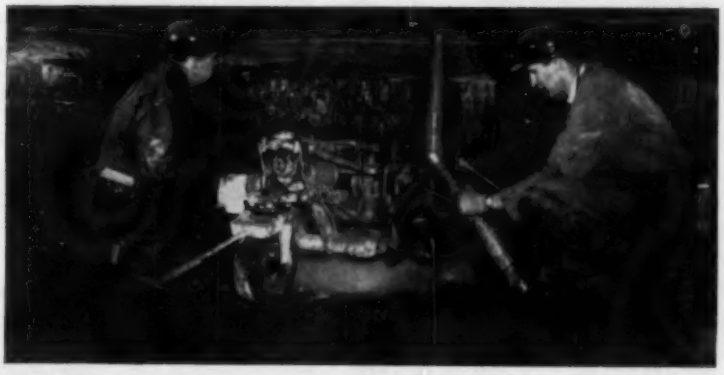
Skid-Shovel Does Multiple Jobs

A 3-yd Drott "Four-in-One" skid-shovel that is convertible to clamshell, bullclam, and bulldozer has been introduced by

CP roof bolting unit increases tonnage 25%

When a West Virginia coal company reached bad roof at their low seam mine, they found that timbering lowered headroom to such an extent that equipment had to be moved at a slow pace to avoid dislodging crossbars. Soon after wood timbering was replaced with 30-inch expansion type bolts, bored and set by a RBD-30 Roof Bolting Unit, daily production jumped 70 tons per shift . . . an increase of 25%.

And the CP mobile Roof Bolting Unit takes less than 3 minutes to complete an entire roof bolting cycle! Where hole depth is less than 36" it's even faster . . . can complete the cycle in 1½ minutes flat. One motor drives both auger and bolt setter . . . the versatile chuck telescopes 6 inches to conform to roof variations. The RBD-30 is available with water swivel attachment; special low speed spindle adapter for slow speed drilling and a low seam drilling attachment for low coal areas.



Chicago Pneumatic 8 East 44th Street, New York 17, N. Y.

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES • ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

the International Harvester Co., 180 No. Michigan Ave., Chicago 1, Ill. In field tests (digging and loading old concrete) the unit was "able to do as much work as three power shovels and a dragline, according to the company. Designated the TD-18, the unit is converted hydraulically by its operator, and is rated at 134-hp.

One-Man Drill for Continuous Blasting

A field-tested drilling unit designed for projects where continuous blasting or drilling is necessary is being manufactured by the Drilling Accessory & Mfg. Co., Inc., 2006 S. Industrial Blvd., Dallas, Tex. Named the "Damco Blastholer," the unit is self-propelled, rotary, and has cut 11-ft holes in 20 sec, according to the manufacturer. In addition, according to field tests, the unit has been moved from one location to the next and set up to begin drilling in 1½ min. The maker declares that the rig will cut approximately 80% of the rock in the United States. A one-man crew can operate the "Blastholer." Its compressor is used for blowing a hole and no other air is required since the compressor, with pressures to 50 lb, is capable of removing cuttings and drilling holes from 2¼ in to 3⅞.

Anti-Corrosion Film Dries In Minutes

"Profilm," a silicate coating with the appearance of paint, can be applied with conventional spraying equipment and will dry to the touch on most applications in a few minutes, says its manufacturer, Allied Porcenell, Inc., Waukegan, Ill. Designed for use where corrosive elements such as acids, alkalis, humidity, moisture, and salt are a source of coating failure and excessive maintenance cost, "Profilm" can be applied to virtually any coatable surface including metal (ferrous and non-ferrous) masonry, wood, and asbestos, according to Allied Porcenell. Because of its inert composition, the manufacturer adds, "Profilm" will provide a "uniform, continuous and low porosity film which lends resistance to a wide variety of chemical environments." Allied Porcenell points out that since the coating dries with extreme rapidity it is often possible to apply successive coatings without moving scaffoldings. Other characteristics: a fire retardant; a non-combustible; non-toxic; available in colors, black, clear, white and metallics.

New Dumps, Scrapers Announced

With the disclosure last month that it would be exhibiting 16 pieces of earth moving equipment at the Chicago Road Show this month, Euclid Div., the earth moving equipment manufacturer of General Motors, announced at least six new earth movers of interest to coal men. These are a 13-yd bottom dump; a "Twin Power" 24-cu yd scraper; a 40-ton rear dump; an 8-cu yd and a 23-cu yd rear dump; and a six-wheel scraper rated at 24 cu yd.

The 13-yd bottom dump features an overhung engine tractor of 218 hp and a top speed loaded of 28.2 mph. Dubbed the S-12, the unit is rated at 40,000 lb payload, carries up to 19 yd heaped and makes a non-stop 180-deg turn in 31 ft, 2 in. Its loading height is 9 ft, 5½ in. Equipped with a standard Euclid 13-yd hopper, the scraper is coupled to Euclid's S-12 overhung engine tractor with a newly designed hitch.

Euclid's 24-yd "Twin Power" scraper, designated Model TS-24, uses two engines to drive separate axles through separate transmissions, although it is a one-man earthmoving unit. A 300-hp diesel in the overhung type tractor and a 218-hp engine behind the scraper serve as a built-in pusher, according to Euclid. Payload capacity is 80,000 lb. Allison "Torqmatic" drives permit changing from three speed ranges under full power.

(Text continued on p 98)

B.F.Goodrich

Universal tires still going strong after nine years' service at Illinois mine

MORGAN MINES, INC., operates 14 units at its Williamson County, Illinois, strip mine. Trucks operate year 'round, hauling 30-ton loads of coal over rock and gravel roads. When this mine opened in 1947, Morgan chose B. F. Goodrich tires—and, writes Superintendent Glenn Peugh, "Some of those original tires are still in service with only one retread! The Universal tread pulls better and gives us far less side-slip and skidding."

B. F. Goodrich builds Universal tires with husky, wedge-shaped cleats that grip the ground for positive traction in forward or reverse. Under the specially compounded tread is the B. F. Goodrich *all-nylon* cord body. Nylon is stronger than ordinary cord materials, withstands double the impact and resists heat blow-outs and flex breaks. The B.F.Goodrich *all-nylon* cord body outwears even the extra-thick Universal tread, *can still be retreaded over and over.*

Why not follow the lead of Morgan Mines and other leading operators all over the country who have switched to B.F.Goodrich tires. Your nearby B.F.Goodrich dealer will show you the tires that will save you money. Or write *B.F.Goodrich Tire Company, A Division of The B.F.Goodrich Company, Akron 18, Ohio.*

MORGAN TRUCKS line up at mine tipple. 90% of the company's tires are B. F. Goodrich.

MORGAN SUPT. Glenn Peugh (left) says, "We are 100% satisfied with B. F. Goodrich tires."

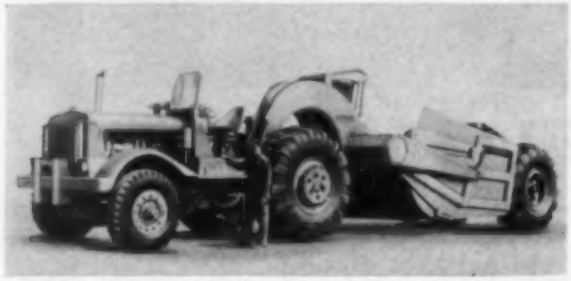
Specify B.F.Goodrich tires when ordering new equipment

B.F.Goodrich
FIRST IN RUBBER

Your B. F. Goodrich dealer is listed under Tires in the Yellow Pages of your phone book

The third of the new units, the 40-ton rear dump, has a struck capacity of 26 cu yd, and is equipped with a "Twin Power" unit with separate engines, each driving its own rear axle through three-speed Allison "Torqmatic" drives. Named the R-40, the dump is powered by either two 235-hp GM engines or by two 250-hp Cummins engines. Both are turbo-charged to provide increased horsepower.

The smaller rear dumps, the 8-cu yd S-7 and the 23-cu yd S-18 (photo), are new type off-highway haulers, according to Euclid. The Model S-7 has a struck capacity of 8 cu yd; 9 yd on a 3 to 1 slope; 11 yd on a 1 to 1 slope and a rated payload of 24,000 lb. It is powered by a 143-hp engine driving a single axle tractor through a five-speed transmission. Top speed is 25 mph, and the unit will climb a 26% grade with a full load, the company says. The Model S-18 is rated at 35 tons. Its capacities are 23 cu yd struck; 24 yd on a 3 to 1 slope; 32 yd on a 1 to 1 slope. A new 300-hp engine with Roots blower powers a single axle. Four speed ranges are provided and non-stop turns in 28 ft are possible. Dumping is accomplished with two three-stage double acting hoists, and a dumping angle of 60 deg.



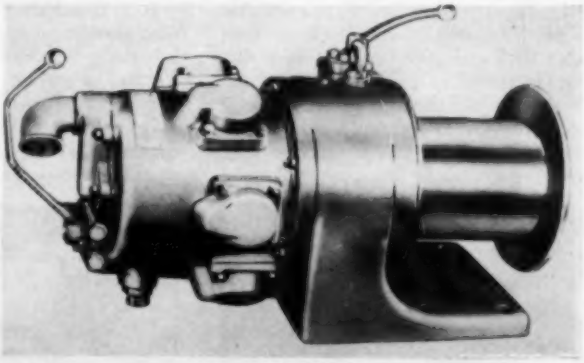
Euclid's newest six-wheel scraper, the SS-24, is rated at 24 cu yd and carries up to 31 yd heaped. It is driven by either a 300-hp GM or 335-hp turbo-charged Cummins engine. Both models are equipped with a 4-speed Torqmatic drive.

Front-End Loader Announced

The TL-20 "Tracto-Loader," a 2-cu yd, front-end loader manufactured by the Tractomotive Corp., Deerfield, Ill., features a complete power shift transmission and torque converter drive which is said to multiply engine torque up to 350%. Powered by an Allis-Chalmers diesel that develops 95½ hp at 2,000 rpm, the loader is designed with three speeds forward and three in reverse, has a top speed of 23 mph. Its 2-cu yd bucket is designed for a tip-back of 40 deg at ground level. Dumping clearance is 9 ft.

Convertible Shovel Is Air Controlled

Thew Shovel Co., Lorain, Ohio, is manufacturing a fully air-controlled, 1¼-yd shovel that is convertible to crane, clamshell, dragline or hoe service. Named the Lorain-56, the unit was designed with these features: two-lever, "Metered-Air" controls for all turntable operations; "Air Ease" power crawler controls; "Shear-Ball" mounting, which eliminates a center pin and nut, centering gudgeon, and turntable rollers; detachable counterweight for highway travel; and an all-welded crane boom. Crawlers are 14-ft long in widths of 11-ft, 4 in or 13 ft. Tread widths are 30-in, but 42-in widths are available. The shovel's boom is 21 ft long with a 17-ft stick and is equipped with an air dipper trip and an air crowd and retract. Power is supplied by a Cummins diesel with torque converter and a disconnecting two-plate clutch.



Hoists Rated At 1,100 lb, 2,200 lb

Atlas Copco Eastern, Inc., Paterson, N.J., has announced two air-powered hoists designed for load limits of 1,100 lb and 2,200 lb. The units, according to the company, are for general needs, i.e., dragging, skidding and lifting. Dubbed the Atlas Copco MHG-41 (photo) and the MHK-61 hoists, the

Caterpillar announces

NEW HEAVY-DUTY RIPPERS

No. 4 No. 6 No. 8 No. 9
for CAT* Diesel Tractors
and Traxcavators*

- **Ruggedly constructed to rip in extremely tough conditions—hardpan, shale, asphalt, frozen ground and other stubborn materials!**
- **Utilizes weight of tractor for positive ripping action at any depth of tooth penetration.**
- **Close mounted for excellent maneuverability in cramped quarters!**

No. 6 Ripper with No. 977 Traxcavator Three teeth standard with provision for two extra. Parallel linkage for same cutting action on all teeth at any depth. Cutting width—82½"; ground penetration—down to 16"; length behind tracks (raised)—29½". Also for use with D6.

No. 9 Ripper with D9 Tractor Three teeth standard. Ripping action is versatile—use one, two or three teeth. Any or all of them can be swung up and pinned out of the way. Teeth pivot 10° to either side. Cutting width—106"; ground penetration—down to 28".

No. 8 Ripper for use with D8 Tractor. Two teeth standard—designed to handle a third tooth. Individual tooth control as on No. 9. Cutting width—92"; ground penetration—down to 26".

No. 4 Ripper for use with D4 Tractor and No. 955 Traxcavator. Three teeth standard with provision for two extra. Parallel linkage. Cutting width—71"; ground penetration—down to 12".

Here's a tough new line of rippers developed by Caterpillar to increase the versatility of rugged yellow Cat Diesel Tractors and Traxcavators. They come equipped with alloy steel teeth with replaceable tips. Their special design and sturdy construction enable you to handle jobs that were previously considered impractical because of difficult digging conditions.

They're one more example of Caterpillar's "leadership in action" policy to produce equipment that helps you do more work at lower cost. For complete information about them, see your Caterpillar Dealer!

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

CATERPILLAR*

*Caterpillar, Cat and Traxcavator are Registered Trademarks of Caterpillar Tractor Co.

NEW HEAVY-DUTY RIPPERS FOR INCREASED PRODUCTION

Bearings, Inc.

the maintenanceman's friend . . . through service!

Dirt . . . the most feared enemy of any good anti-friction bearing was damaging many bearings in the maintenance stock at the Taylor and Boggis Foundry Division of The Consolidated Iron-Steel Mfg. Co. of Cleveland, Ohio. John Cunin, Bearings, Inc. salesman, was called and within a short time, under the direction of the Taylor and Boggis Maintenance Superintendent reorganized their maintenance stocks of bearings and developed a more practical record keeping system.

First—all bearings in stock long enough to be affected by foundry dust were taken to Bearings, Inc. There, they were thoroughly cleaned, rewrapped and repackaged to be as dustproof as possible.

Second—all bearings in use in the foundry were identified by the Bearings, Inc. salesman according to the bearing manufacturers' numbers. By converting the equipment manufacturers' parts numbers to standard bearing numbers, many bearings purchased from various sources under a variety of parts numbers were found to be identical.

Weeding out these duplicates greatly reduced Taylor and Boggis purchases for inventory. Bearings, Inc. now knows what bearings the foundry uses and makes certain stocks for any emergency are carried at our branch. Taylor and Boggis now installs only factory-fresh bearings from inventory or orders from Bearings, Inc. and receives the bearings they need immediately.

Need this kind of service—service with a capital "S"? Just call our nearest branch—no obligation, of course.

Rendering bearing service in the territories adjacent to our branches, listed below.

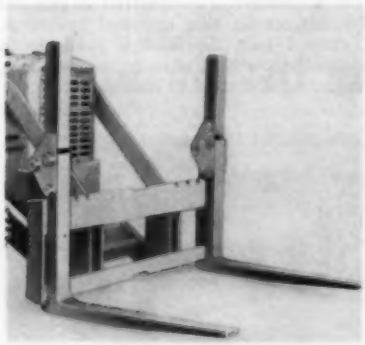
BEARINGS, INC.

OHIO: Akron • Canton • Cincinnati • Cleveland • Columbus • Dayton • Elyria • Hamilton • Lima • Mansfield • Toledo • Youngstown • Zanesville
INDIANA: Ft. Wayne • Indianapolis • Muncie • Terre Haute
PENNSYLVANIA: Erie • Johnstown • Philadelphia • Pittsburgh • York
WEST VIRGINIA: Charleston • Huntington • Wheeling
NEW JERSEY: Camden • **MARYLAND:** Baltimore
Subsidiaries: Bolanrol Corp. • Buffalo, N.Y.•
Kentucky Ball and Roller Bearing Co. • Louisville, Ky.

units are equipped with controls ranging from creep to a rope speed of 160 ft per min at full load. Both hoists operate at 85 psi air pressure. The 265-lb MHG-41 operates off a 1-in air line and can lift up to 1,100 lb. Equipped with 400 ft of 5/16-in wire rope, the MHG-41's rope drum is 7¾ in wide, 6¾ in in diameter. Motor output is rated at approximately 6.2 hp. The 530-lb MHK-61 with a motor output of approximately 13.2 hp can handle 2,200-lb loads. Operating from a 1¼-in air line, the MHK-61's rope drum is 9¾ in wide, 9¼ in in diameter. It is equipped with 460 ft of 7/16-in wire rope.

Lubricating Suction Gun

A suction gun designed for high performance at low cost, according to the manufacturer, is being sold by the Lincoln Engineering Co., 2729 Natural Bridge Ave., St. Louis 20, Mo. The gun will service gear cases, transmissions, differentials and can be used for transferring lubricant. The manufacturer says that even at full capacity (18 oz), and with nozzle down, lubricant will not leak.



Tractor Fork Attachment

Caterpillar Tractor Co., Peoria, Ill., has begun making log and lumber fork attachments for No. 977 Traxcavators. The attachment will also handle poles, pipes, pallet loads and other similar materials. The fork includes a carriage which is attached to the tractor's lift and tilt arms in place of a bucket. The two fork tines are mounted on the carriage and can be adjusted to 45-, 60-, 75- and 87½-in centers. Adjustable standards can be set vertical or forward 35 deg.

Cast Iron Brakemotors

A line of cast-iron brakemotors that stop instantly and hold heavy loads, according to the manufacturer, has been developed by the Reliance Electric & Engineering Co., 1088 Ivanhoe Rd., Cleveland 10, Ohio. Features include a wide torque range—from 3 lb-ft to 345 lb-ft; one-piece molded friction linings for quick stops; and one-operation torque setting. If power fails or voltage drops, the unit's "dead man" operation sets and holds the load until normal operation is

YOU'LL DO BETTER *with* DIFFERENTIAL

THE COMPLETE MINE HAULAGE SYSTEM

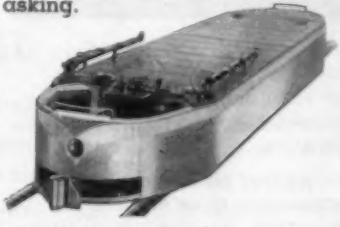
Examine the facts and, chances are, you'll specify Differential.

Every type of mine hauling equipment — locomotives, mine cars, rotary dumpers, mine supply cars, air dump cars, rock larries, ballast cars, mantrip cars — can be supplied. Our engineering and sales counsel are available to you without charge — yours for the asking.

Rotary Dumper

Mantrip Cars

Mine Supply Cars



Only Differential offers the complete mine haulage system.

Large-Capacity Mine Cars

D DIFFERENTIAL STEEL CAR COMPANY FINDLAY, OHIO

SINCE 1915—PIONEERS IN HAULAGE EQUIPMENT

CONTRACT CORE DRILLING

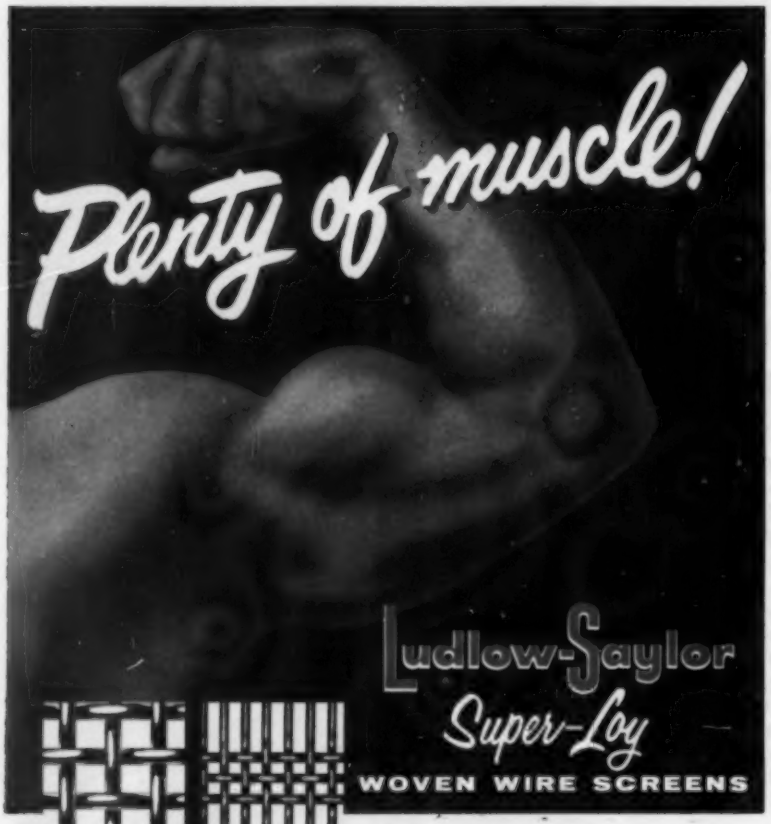
EXPLORATION FOR MINERAL DEPOSITS
INCLUDING URANIUM & LIMESTONE — ANYWHERE

FOUNDATION TEST BORING • GROUT HOLE DRILLING

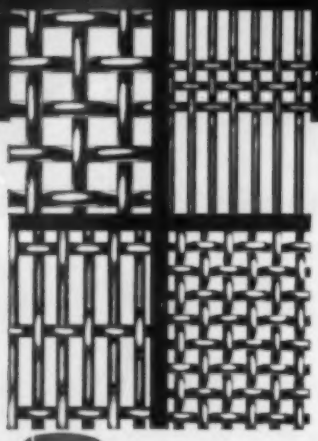
Skilled crews and complete stock of core drills and accessory equipment maintained at all times

Core Drill Contractors for more than 60 years

JOY MANUFACTURING CO.
Contract Core Drill Division
MICHIGAN CITY, INDIANA



Ludlow-Saylor
Super-Loy
WOVEN WIRE SCREENS



- Superior strength and increased durability . . .
- Longer retention of screen accuracy...
- Greater resistance to vibration, fatigue and abrasion...

. . . ALL of these mean more economical, more efficient operation.

Most weaves and sizes shipped from stock.

Write for Condensed Screen Reference Catalog

SINCE 1854

LUDLOW-SAYLOR WIRE CLOTH CO.
609 South Newstead Avenue, St. Louis 10, Missouri

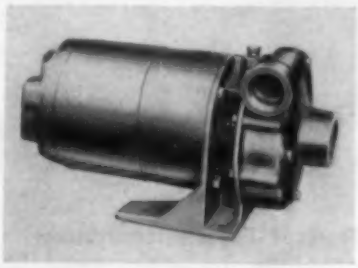
SALES OFFICES: Birmingham, 1727 Sixth Ave. North; Chicago, 5807 W. Diversey; Pittsburgh, Union Trust Building; Houston, 1213 Capitol Ave.; Denver, 1530 Carr St.; WEST COAST: Star Wire Screen and Iron Works, Inc., 2515 San Fernando Road; Los Angeles: Subsidiary, Ludlow-Saylor Wire Cloth Co.

Equipment News *(Continued)*

restored. All types of enclosures are available.

Two-Speed Electric Hoist

Two-speed "Speedway" electric hoists equipped with fractional horsepower 1800/450 rpm motors, provide fast lifting and lowering speeds, plus slow quarter normal speed for gentle positioning. Manufactured by the Wright Hoist Div., American Chain & Cable Co., Inc., York, Pa., the unit can be serviced in minutes by unscrewing side and end covers. A Frame 1 unit, the hoist is available in parallel mounting, cross mounting, hook mounting and rigid or bolt mounting.



Close-Coupled Pump

A close-coupled centrifugal pump in which the motor and the pump are single units has been developed by Gould

Here's why Euclid Equipment cuts hauling costs in open pit coal mines

Bottom-Dump Coal Haulers are powered by engines of 200 to 360 h.p.—have 5 and 10 speed transmissions, capacities of 25, 40 and 51 tons and loaded travel speeds up to 40 mph.

Rear-Dump Euclids have rated capacities of 10, 15, 22, 34 and 50 tons—engines of 125 to 600 total h.p., standard 5 and 10 speed transmissions or Torqmatic Drive, spring mounted drive axles, top speeds loaded to 36 mph.

✓ LARGE CAPACITY

Bottom-Dump Euclid Coal Haulers have capacities of 25 to 51 tons. They are available with large single tires or duals on tractor drive and trailer wheels to meet your particular haulage problem.

Rear-Dump "Eucs", ranging from 10 to 50 ton payload are widely used for overburden removal as well as for hauling coal from pit to tipple. There are 5 models—a complete line to meet every coal or waste hauling requirement.

✓ POWER AND SPEED

Depending on model, engines are from 128 to a total of 600 h.p. with 5 and 10 speed standard transmission or Torqmatic Drive that consists of a torque converter with a semi-automatic transmission. Top speeds with full payload range up to 36 mph.

✓ DEPENDABLE PERFORMANCE

Because "Eucs" are designed exclusively for off-the-highway service, they pay off in long life and low maintenance cost. They stay on the toughest jobs longer with less down time for servicing and repairs. Whether they're hauling coal or overburden . . . on long or short hauls . . . "Eucs" move more loads at lower cost per ton.

EUCLID DIVISION, General Motors, Cleveland 17, Ohio

***For high production and low cost hauling* EUCLIDS ARE YOUR BEST INVESTMENT**

Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE

Handy-Portable . . .

MINE SUMP PUMP

Bronze and Stainless Steel Construction

Designed for easy handling and installation—at the face—in local dips—wherever water gathers in the mine.

NOTE THESE EMGLO FEATURES:

- Electric—Automatic Operation
- Adjustable Differential Action Sump Control
- Available in 110 and 220 V.AC and 250 V.DC
- All Castings Acid-Resisting Bronze, Non-Fouling Impeller
- 1¼" Discharge

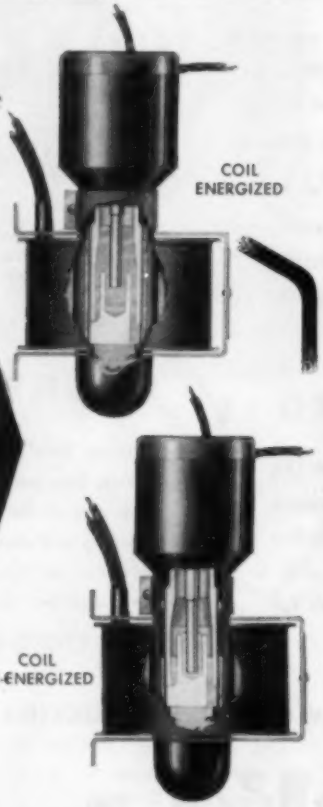
EMGLO *Products*
Div. M. Glosser & Sons, Inc.
80 MESSENGER ST. · JOHNSTOWN, PA.

Sold by Your Mining Equipment Distributor

The TIMER RELAY that handles all controlled timing problems . . .

- ★ No false contacts
- ★ Non sticking
- ★ Practically "fail safe"
- ★ Low cost timer

Durakool®
STEEL MERCURY TIMERS



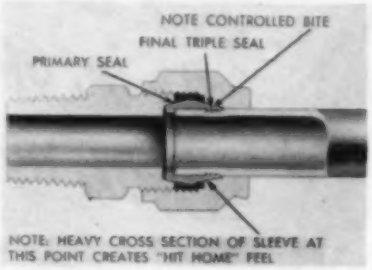
This steel clad, factory set, tamper proof Durakool timer-relay is practically non-breakable. Operating life multiplied 5 to 6 times by new plunger construction features. Combinations of operate-release time delays from 0.15 sec. to 20 sec.—either normally open or normally closed action.

See telephone directory for local distributor, or write.

DURAKOOL, INC.
ELKHART, INDIANA, U.S.A.
700 WESTON RD., TORONTO 9, CANADA

Equipment News *(Continued)*

Pumps, Seneca Falls, N.Y. This feature, says Gould, makes installation quick and inexpensive. The unit is merely bolted down, power and piping are connected, and the pump is ready to use. Its close-coupled construction permits permanent alignment of rotating parts, since no coupling is required. Once the pump is primed, its mechanical seal is protected from running dry. The seal is designed to prevent leakage, reportedly will not bind the pump's shaft, and will not require adjustment or periodic maintenance.


NOTE CONTROLLED BITE
FINAL TRIPLE SEAL
PRIMARY SEAL
NOTE: HEAVY CROSS SECTION OF SLEEVE AT THIS POINT CREATES "HIT HOME" FEEL

Flareless Tube Fitting

"Hi-Seal," a flareless tube fitting introduced by the Imperial Brass Mfg. Co., 1200 W. Harrison St., Chicago 7, Ill., is said to be a foolproof, butt-tight joint designed for a full range of pressure conditions. Imperial points out that since a butt-joint is formed, tubing need not be sprung when making assemblies. A shoulder on the tube fitting sleeve prevents incorrect assembly even by inexperienced personnel. Three serrated edges on the sleeve bite radially into the tube surface to a controlled depth to make a triple seal.

Single Cable TV System

A single-cable industrial television control system, which combines both visual observation and remote control throughout a plant over a closed circuit has been introduced by the Jerrold Electronics Corp., 23d & Chestnut Sts., Philadelphia, Pa. Jerrold says that a "unique feature of the system is its ability to carry all functions—two way pictures, two way communications, and remote control—over a

baby, it's coal outside

1. **FREEZE PROOF**—Coal is easier to sell when it's easier to handle. Permatreated coal resists freezing both in transit and in stock piles. Freeze-proof coal is a customer benefit for industry or home. Take the worry out of winter sales when you sell Permatreated coal – freeze proof, easier to handle
2. **DUST PROOF — ODORLESS**—Permatreated coal insures dustless delivery and handling, odorless storage and burning
3. **DECREASE WATER ABSORPTION**—Permatreated coal repels water
4. **REDUCE MOISTURE**—Add 300,000 BTU per ton for each 1% reduction in moisture
5. **AVOID CORROSION**—Non-corrosive Permatreat can't pit or corrode stoker equipment
6. **MAINTAIN QUALITY**—Permatreat reduces deterioration from weathering
7. **ELIMINATE WINDAGE LOSS**—that results in lost weight claims and air pollution complaints
8. **CONTROL BULK DENSITY**—Permatreat insures uniform coke production and quality

Coal treated with . . .

Ashland
PERMATREAT
COAL SPRAY
seals in dust

"lasts the life of the coal"

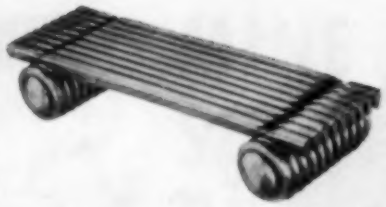
Interested? Write, wire or phone

ASHLAND OIL & REFINING COMPANY

Ashland, Kentucky

Special Advisory Service available from nationally recognized authorities on coal treatment.

THE LAST WORD IN SCREENING EFFICIENCY



The word's out on wedge wire and *Hendrick has it!*

That's right. With the addition of new Hendrick Wedge Wire, Hendrick now makes available a complete line of screens for the best in efficient, low-cost screening, dewatering and filtering operations. It's ideal wherever it is important that screen openings be minutely fine, have excellent draining qualities and a high degree of accuracy and rigidity. For details on how Hendrick Wedge Wire can best be applied to your specific requirements and afford tops in low-cost, efficient screening, call your nearby Hendrick Sales Engineer. He's listed in your local classified telephone directory under *Perforated Metals.*

Hendrick
MANUFACTURING COMPANY
41 DUNDAFF STREET, CARBONDALE, PA.
Sales Offices in Principal Cities

Perforated Metal • Perforated Metal Screens • Wedge-Slot and Hendrick Wedge Wire Screens • Architectural Grilles • Mitco Open Steel Flooring • Shur-Site Treads • Armorgrids • Hendrick Hydro-Dehazer

Here's How You Can Save Time & Money inspecting—cleaning—relocating Your Pipe Lines

ALUMIRON COUPLINGS
for grooved end pipe

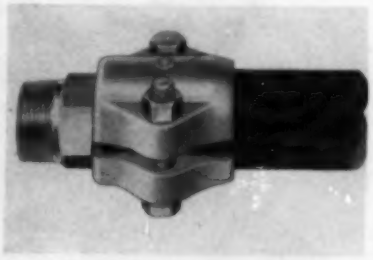
- Cut material and labor costs by using these malleable iron and aluminum couplings on your steel, aluminum, cast iron, wrought iron and spiral weld pipe.
- Pipelines become "portable" when you couple them with Alumiron Couplings—quickly couple or uncouple them by means of two bolts through the coupling halves. A leak proof seal is easily made by pulling up the two half housings with a socket wrench.
- The flexibility of the Coupling corrects for slight piping misalignment and permits the line to adjust to the slope and uneveness of the ground.
- Furnished with Buna N or Neoprene gaskets designed to produce a leak tight seal which increases as the vacuum or pressure increases up to 1000 lbs.
- Stocked in 2, 3, 4, 6 and 8 inch sizes. Other sizes on request.

Write for Literature and Prices. Distributor Inquiries Invited.

CHARLES E. MANNING CO.
4700 Clairton Blvd. Pittsburgh 36, Pa.

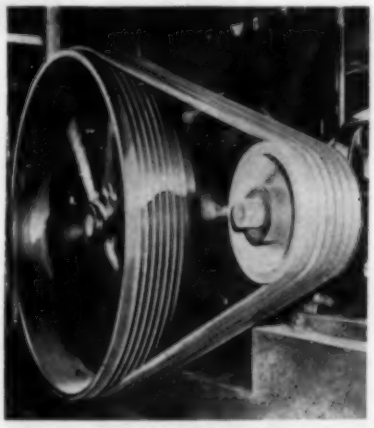
Equipment News *(Continued)*

single coaxial cable." The company points out that previously a separate cable had been required for each function. The system permits the use of any closed circuit television camera. Cameras of different makes can be mixed in the system and plugged in anywhere. Receivers, too, can be added by plugging-in along the circuit. Control over cameras—focusing, up and down adjustments—is applied remotely and through the single coaxial cable.



Clamp Type Hose End

A clamp type hose end for high pressure air lines, hydraulic fluids and steam is being manufactured by the Weatherhead Co., Fort Wayne Div., Fort Wayne, Ind. The unit reportedly will replace any original equipment and is easily installed. Features: cadmium-plated to resist corrosion; clamp halves designed to match perfectly.



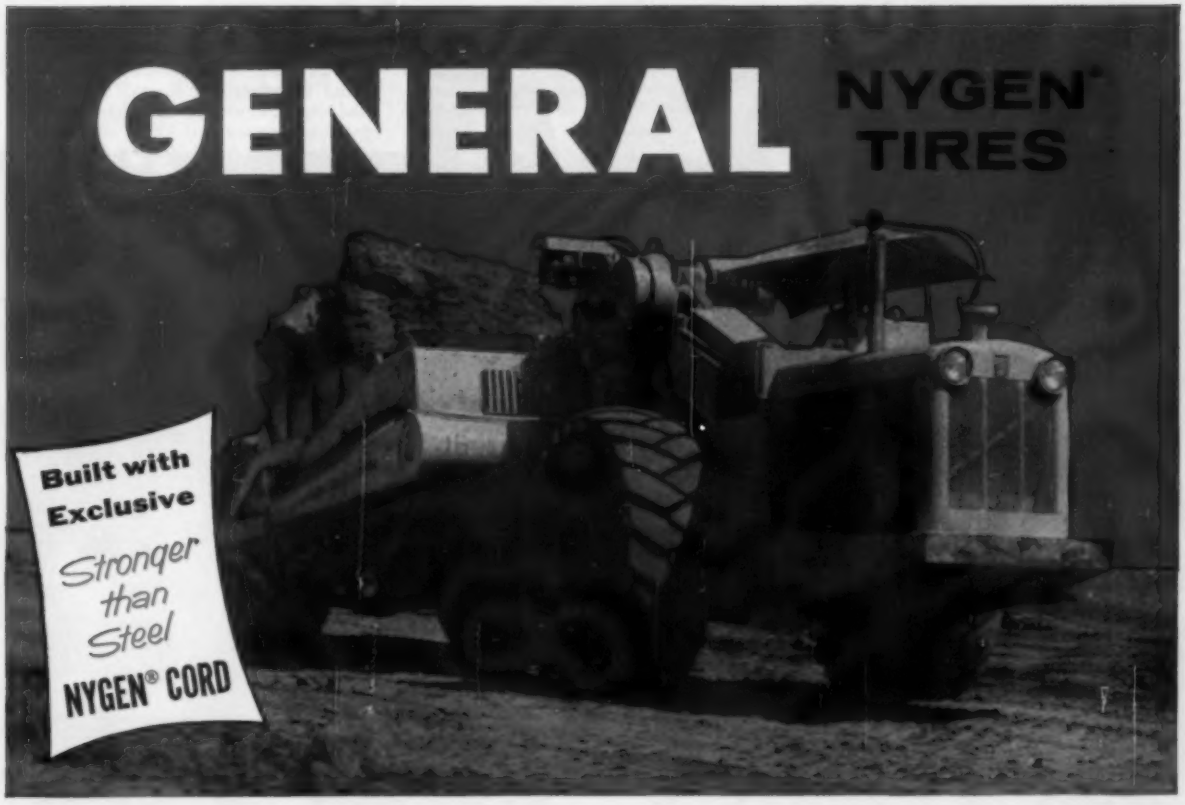
Cost Reducing V-Belt

Thermoid Co., Trenton, N.J., is manufacturing a new "Powerflex Hi-Capacity" V-belt featuring a special oil resistant cover to prolong belt life. Reportedly containing up to 40% more strength than standard belts, the "Powerflex" is said to reduce belt failure to a minimum. Lower drive costs can be achieved, says Thermoid, since fewer belts and narrower sheaves are required to handle a load. Bearing life is increased because of lighter weight and lower stresses.

Coil Insulating System

A field coil with a newly developed insulating system designed to protect elec-

GENERAL NYGEN® TIRES



...Designed to stand up where others let down!

Unsurpassed for ruggedness, strength and dependability, General Truck Tires deliver the maximum in profitable performance. From the big, new All-Duty LCM with extra wide treads for tractor-like drive and flotation, to the rough, tough HCT Logger, the General Truck Tire performs better because *it's built better!* You'll get the job done faster and for more profit when you switch your equipment over to Generals.

specify GENERALS on your new equipment

THE GENERAL TRUCK TIRE

THE GENERAL TIRE & RUBBER CO., Akron, Ohio

tric motors and generators against atmospheric contaminants and destructive mechanical forces has been introduced by the Allis-Chalmers Mfg. Co., Milwaukee, Wis. Primary insulation is the unit's "integrated" construction of glass fibers and inorganic heat-stable resins. The resins bond so well with coil conductors and pole surfaces that the structure is fused together into one integral part. The enveloping skin is inseparably locked with the coil and tightly pressure molded to coil contours, according to the company,

which recommends its field coil construction for applications requiring chemical resistance, oil and moisture-proofness, and sealing against carbon black, dust and dirt. It is also recommended to withstand vibration and thermal shock. The coil construction is currently available for synchronous and DC machines subject to severe duty cycling in Class A and B temperature classifications.

"BETTER than MONEY in the BANK!"

That's what one of our customers said as he ordered his TWELFTH Stamler Car Spotter!

It happened one day just several months ago. We received a phone call from an official of a large coal mining company. Wanted to know if he could get another Stamler Car Spotter before the end of the year. It wasn't that he needed it that fast but he had about $5000.00 left over in his equipment account for 1956—and he wanted to spend the money on another Stamler Car Spotter.

Because, as he said, he thought buying another Stamler unit was better than keeping the money in the bank. Naturally we liked the compliment. He'd already bought seven units from us in 1956 and this one made *twelve* all told for his company since 1950.

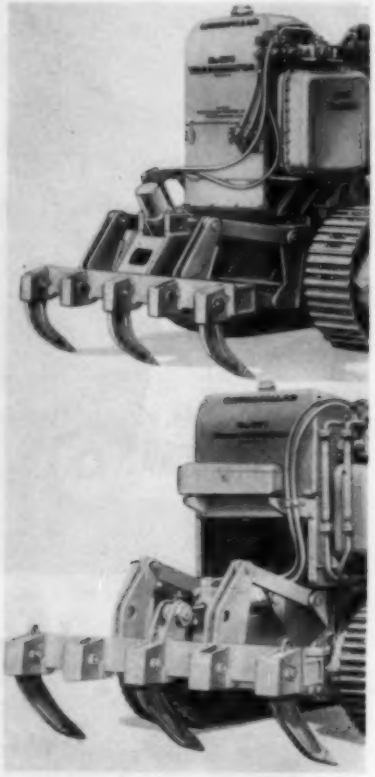
That's the way it usually goes. Once mining companies find out about the cost-reducing and tonnage-increasing qualities of Stamler Barney Car Spotters they keep on ordering Stamlers. We are making an increasing number of sales where the Stamler reputation for long life and trouble-free service has dictated the change from less satisfactory equipment to Stamlers. When are you going to order your first Stamler? The record of Stamler superiority is there for you to see. Get the Stamler story NOW.

STAMLER *Hydraulic* CAR SPOTTERS

SCHROEDER BROS., Exclusive Eastern Sales Agent
Pittsburgh, Pennsylvania
UNION INDUSTRIAL CORP., Carlsbad, New Mexico

W. R. STAMLER CORPORATION
PARIS, KENTUCKY

SALMON & CO., Birmingham, Alabama
WESTERN SALES ENGINEERING CO.,
Salt Lake City, Utah



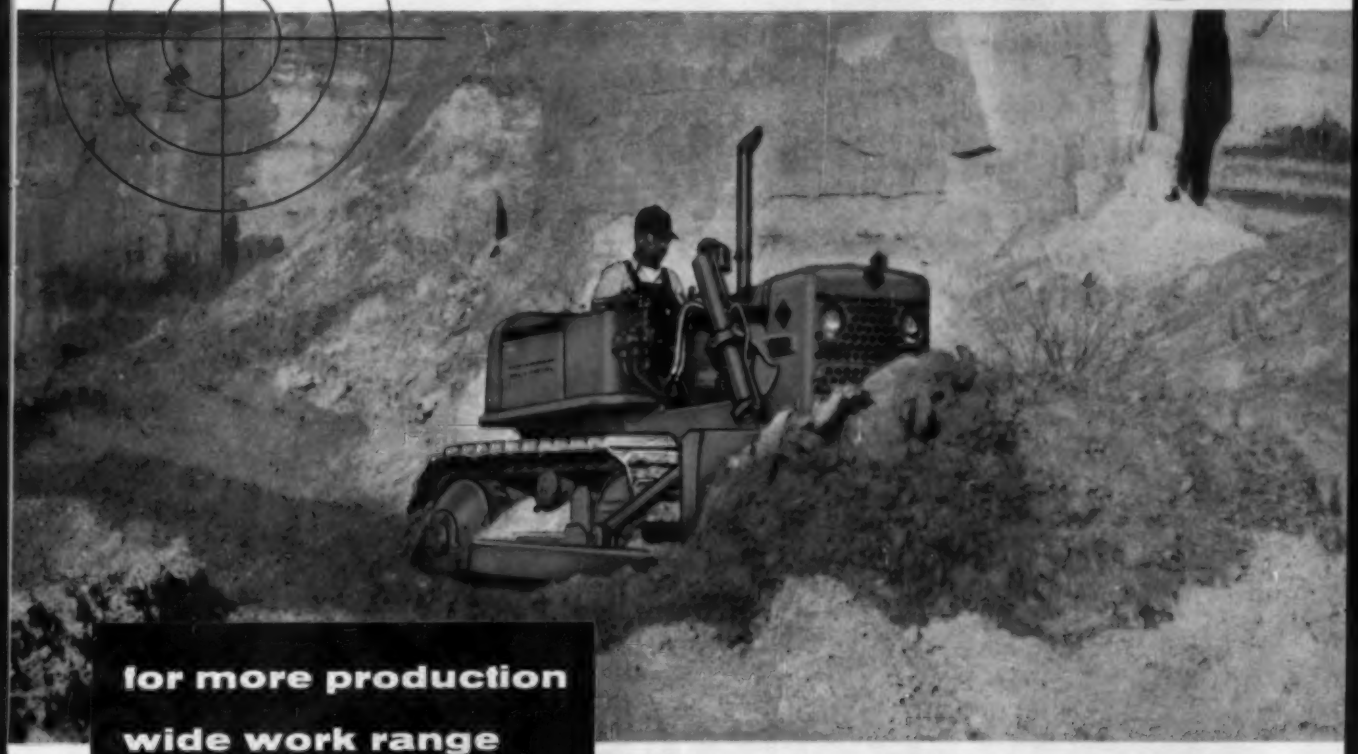
Tractor-Mounted Rippers

Two new tractor-mounted rippers designed to speed bulldozing and loading have been added to the line of Caterpillar products. The largest of the rippers, the No. 6 (*bottom*), is for use on the Caterpillar D6 tractor and the No. 977 Traxcavator. The smaller ripper, the No. 4 (*top photo*), is designed for use on the company's No. 955 Traxcavator. Both rippers are operated through standard hydraulic controls. In both three steel teeth with replaceable tips are the normal installation, but two more teeth can be added. Both rippers are said to be rugged enough to permit the full power of the tractor to be absorbed by one tooth at maximum penetration. Caterpillar points out a feature in which the use of parallel linkage maintains the same angle of penetration at all depths. Ground clearance is 30 in. according to the company, and additional clearance can be obtained by installing the teeth upside down.

Double Strand Sprockets

Double-strand roller chain sprockets that require no reboring or machining for shaft installation are being manufactured by Dodge Mfg. Corp., Mishawaka, Ind. As an addition to the company's "Taper-

Set your sights on an HD-6B



for more production
wide work range
low job costs

52 drawbar hp — 63 belt hp — 15,540 lb (with dozer) and all these exclusive on-the-job advantages important to owners and operators.

All-steel, box-A main frame — soaks up shock loads.

One-piece steering clutch and final drive housing — line-bored for true alignment of shafts and gears.

Straddle-mounted final drives — with bearings on both sides of gears to maintain gear tooth alignment.

Heavy-duty truck frames — keep tracks in line, reduce wear . . . help get more work done at lowest possible cost.

Allis-Chalmers long-life diesel engine — with follow-through combustion that delivers power for big output with ample power reserve.

Simplified lubrication — including 1,000-hour lubrication intervals for truck wheels, idlers, and support rollers . . . provides extra working time.

Unit construction — makes service easier, faster . . . major units can be removed without disturbing adjacent assemblies.

Operator ease and comfort — with foam rubber seats . . . responsive controls . . . full visibility.

Wrap-around radiator guard— serves as dozer lift frame . . . reduces weight and cost, produces superior balance for tractor-dozer.

Engine-mounted bulldozers — direct lift . . . positive down pressure . . . hydraulic straight blade or angle blade.

Plus heavy-duty, tapered roller bearing truck wheels, heavy duty truck wheel guards, 24-volt direct electric starting, crankcase guard, bumper, and lights at no extra cost.

Check the complete service program offered by your Allis-Chalmers Construction Machinery dealer. His factory-trained servicemen, factory-approved facilities, and stocks of True Original Parts keep your equipment operating properly . . . add up to the kind of service that saves you money.

ALLIS-CHALMERS, CONSTRUCTION MACHINERY DIVISION, MILWAUKEE 1, WISCONSIN

Get all the facts from your Allis-Chalmers dealer . . . now!

ALLIS-CHALMERS

A-C ALLIS-CHALMERS

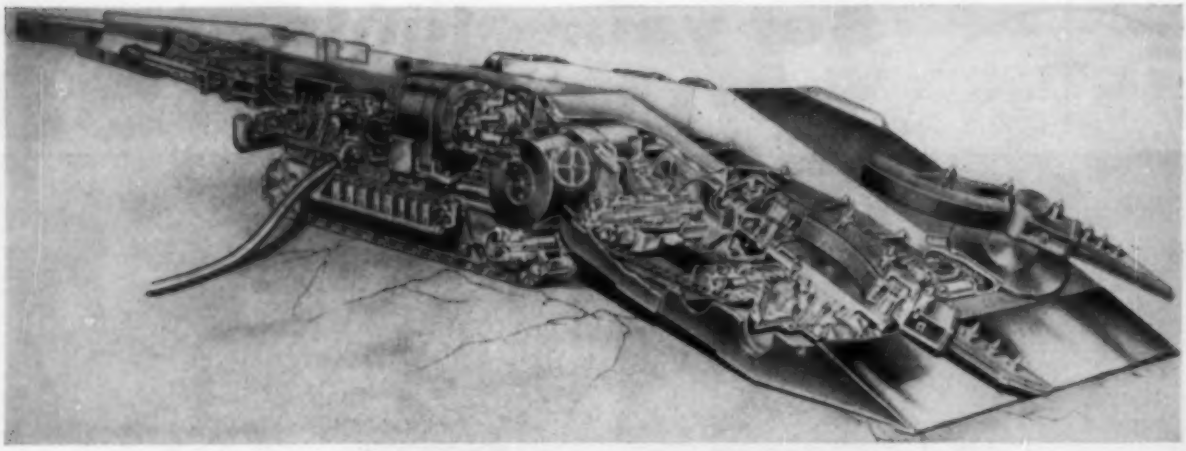


PHOTO COURTESY JOY MFG. CO.

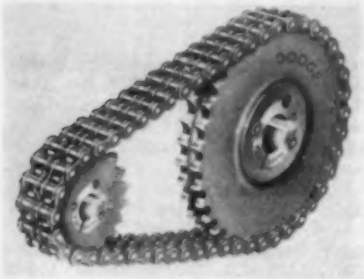
Amoco mine lubrication provides safe, sure gear protection!

Unusual extreme pressure characteristics and extra oiliness qualities, plus ease of handling at low temperatures, make Amoco Leaded Lubricants a favorite in many mine operations. Recommended for universal joints and gear cases of loading machines, shuttle car wheel units, worm gear speed reducers, heads and gear cases of mining machines, open gears, and many other applications. Another great product by Amoco!

AMOCO LUBRICANTS

...SURE • SAFE *FOR MINE MACHINERY*

AMERICAN OIL COMPANY AMOCO



Lock" line, the sprocket's design permits users to buy sprockets, and bushings of the desired shaft size, then mount them without reboring, key-seating and set-screw machining.

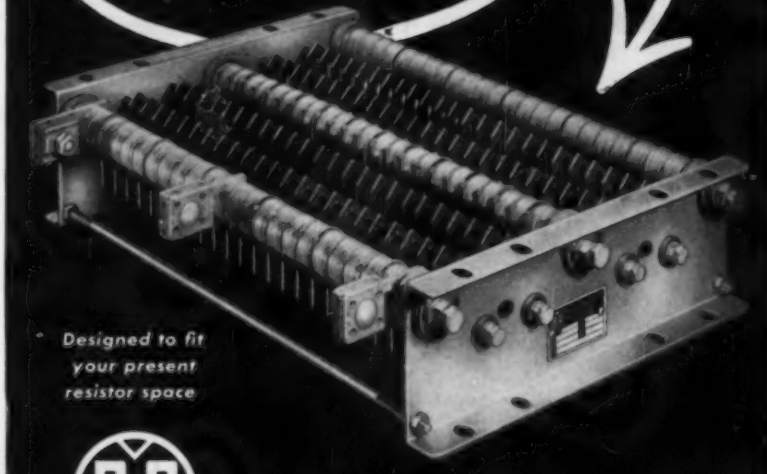
Lubricant Pressure Gun

An all steel, high pressure lever gun for use with the new 14½-oz grease cartridges is being manufactured by Lincoln Engineering Co., 2729 Natural Bridge Ave., St. Louis 20, Mo. With the gun, according to Lincoln, lubricant stays refinery pure and is more convenient to handle and store. The unit develops 10,000 psi maximum pressure, and can be loaded with all normal pressure gun lubricants.

Lubricant Dispenser

A portable, manually-operated gear lubricant dispenser equipped with a steel

RUGGED
all the way thru!



Designed to fit your present resistor space

P-G STEEL GRID RESISTORS
consistently prove their value in
MINING SERVICE

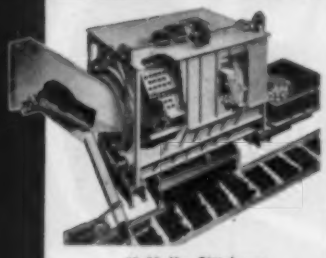
- Steel Construction
- Mica Insulation
- Corrosion Resistant
- Vibration Proof
- Moisture Resistant
- Provision for Expansion
- Adequate Ventilation
- Rugged Terminals

By use of those durable raw materials . . . steel and mica, and the P-G exclusive features of design, these steel grid resistors have the "built-in quality" to overcome factors which often cause resistor failures. Vibration, moisture laden or corrosive atmospheres have little effect on continuity of service. Try Post-Glover Resistors for heavy duty applications where resistors are subject to severe service . . . continuous "Trouble-Free" performance is assured.

P-G The Nonbreakable Steel Grid Resistor

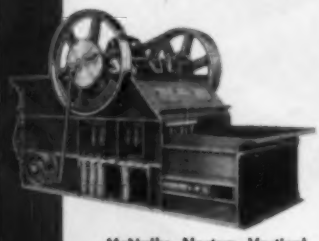
THE POST-GLOVER ELECTRIC COMPANY
•ESTABLISHED 1890•
221 WEST THIRD STREET, CINCINNATI 2, OHIO

America's most complete line of CRUSHING EQUIPMENT



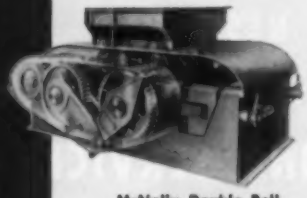
McNally Pittsburg Rotary Breaker

This unit allows positive control of top size in handling run-of-mine washery feed. Production of fines is held to a minimum.



McNally Norton Vertical Pick Breaker

50% Less fines when reducing lump to egg and stove sizes.



McNally Double Roll Gearmatic ROM Breaker

Built in tonnage ranges from 750 tph to 1400 tph. Full floating gearmatic drive.

McNally Gearmatic Stoker Coal Crusher

This unit offers three prime advantages: high volume production, plus accurate sizing, plus low percentage of fines.

McNally Single Roll Crusher

Universal application 20", 24" and 36" diameter rolls.

AVAILABLE

From Stock and on Short Delivery

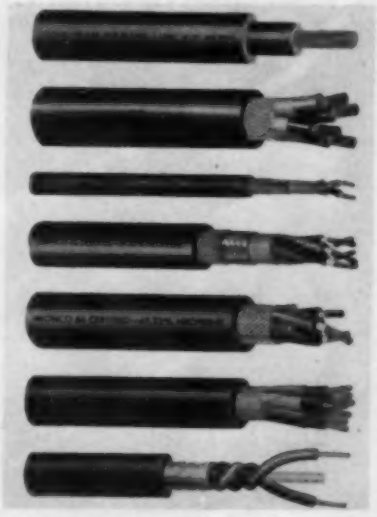
For immediate action on complete information write, wire, or call.

McNALLY PITTSBURG MFG. CORP.

Pittsburg, Kansas Wellston, Ohio

Equipment News *(Continued)*

cover that can be clamped in 30 sec to any standard 25-lb to 50-lb original refinery container, is being manufactured by the Lincoln Engineering Co., 2729 Natural Bridge Ave., St. Louis 20, Mo. Designed for fast, clean refilling, the unit is sold with a 5-ft hose assembly and a curved non-drip nozzle. Lubricant output is one pint per 10 strokes. Maximum pressure is 400 lb.



New Wires and Cables

A number of electrical wires and cables have been introduced by the Western Insulated Wire Co., 2425 E. 30th St., Los Angeles 58, Cal. Two kinds of Type U.S.E., Style RR nonmetallic-sheathed 600-v cable is being offered under the "Bronco" label, one kind suitable for bur'al in the earth, the other suitable for general purposes, e.g. raceways, ducts, open wiring. Both are made with a Neoprene outer sheath and heat-resistant, super-aging rubber insulation, according to Western Insulated. Bronco 66 certified Type SO shielded cord, another new product, is being made with two, three and four conductors, sizes 18 through 10. Insulation is a buna rubber compound and its jacket contains not less than 67.32% new Neoprene. Western is also manufactur'ng special cords and cables designated Type W "P&R." The cord is made in sizes 18 through 10 with two, three and four conductors. The cable is made with two and three conductors in sizes 8, 6, and 4. Control cables for a 600-v stationary installation have also been added to the Bronco 66 line. Available in AWG s'zes 14, 12, and 10 with from 2 to 24 conductors, the cables are insulated with buna rubber on each conductor and protected by a Neoprene jacket. Another new item is the "Miners' Lamp Cord," which is designed for extreme flexibility. Made with two, three or four conductors wound in a spiral around a core of acetate yarn, the cord is covered with age-resistant Neoprene jacket.

Automatic Emergency Light

An emergency light unit that operates automatically at the moment of power failure has been developed by the Exide Industrial Div., the Electric Storage Battery Co., Philadelphia, Pa. The unit, in addition, will automatically prepare itself for the next blackout, says Exide. After an emergency the Model A recharges its storage battery at a high rate. At the end of the high-rate charge the unit's "Lightguard" returns the battery to a trickle-rate charge. Water is required 2 to 3 times a year. The battery will furnish current to one 25-w sealed beam for 8 hr, to two 25-w lamps for 3¼ hr and to three 25-w lamps for 1½ hr.

Equipment Shorts

PAYROLL TAX COMPUTER—"Calcu-Tax," an aid to payroll preparation, shows withholding tax and the new 2¼% social security deductions in one line for wage brackets up to $250. All information is on a single board on which is mounted a

BURNS 45% LESS FUEL

Since he switched to GM Detroit Diesel Power

When Pennsylvania's Augenbaugh Coal Company replaced two gasoline engines with a pair of General Motors Detroit Diesels on their Jaeger pumps, it really paid off. Partner Jack Augenbaugh reports the GM Detroit Diesels cut fuel consumption 50 gallons per day.

And that's not all. For Jack says his Diesels have run day and night for more than two years and "have never been touched." The old gasoline engines required an overhaul every three weeks.

Got a job that needs dependable power at low cost? Get GM Detroit Diesels. They're available in single engines from 30 to 300 h.p.—multiple units up to 893 h.p.—in over 1,000 different applications of power machinery. Your GM Detroit Diesel distributor or dealer will give you details or write direct.

GM DIESEL POWER

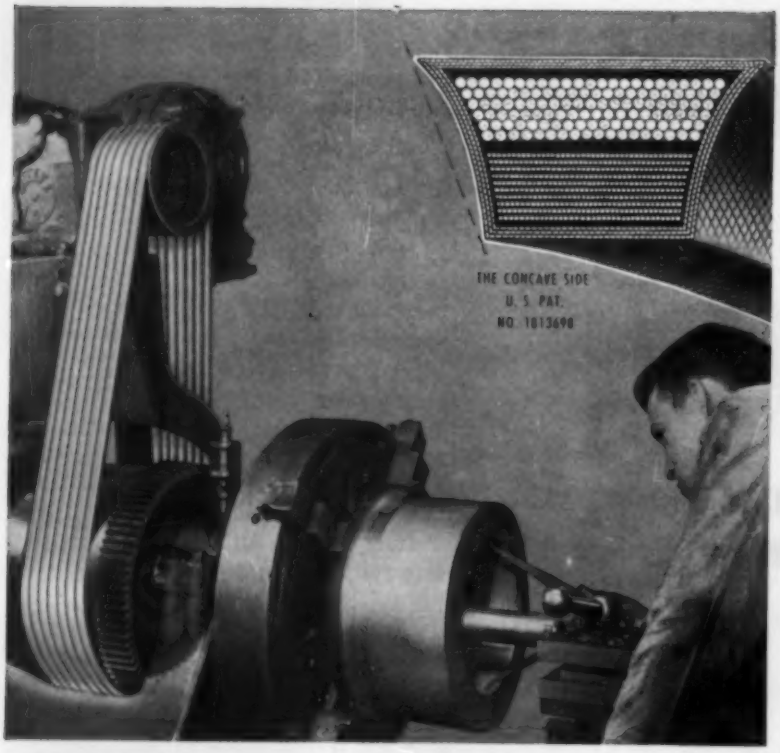
DETROIT DIESEL

Engine Division of General Motors
Detroit 28, Michigan

REGIONAL OFFICES: New York, Atlanta, Detroit, Chicago, Dallas, San Francisco

Factory Engineered Parts—
Factory Trained Servicemen Everywhere

GM "2-71" Detroit Diesel running Jaeger pump for Augenbaugh Coal Co., Clearfield, Pa.



WHY you get more service from V-Belts with concave sides

Each sidewall of a Gates V-belt is concave (Fig. 1) — a precisely engineered curve that makes V-belts last far longer.

HERE'S WHY: on the bend around the sheave, the concave sides of a Gates V-belt fill out and become straight (Fig. 1-A). Thus the belt makes full contact with the sides of the sheave, grips the sheave *evenly*.

This even contact distributes wear uniformly across the sides of the belt. Uniform wear lengthens belt life; keeps costs down.

MAKE THIS SIMPLE TEST

Bend a straight-sided belt (Fig. 2). The sides bulge at the bend causing uneven contact in the sheave groove (Fig. 2-A). Naturally, wear is greater at points indicated by arrows. Result: shorter belt life, increased belt costs.

To cut down-time and V-belt replacement costs, specify belts that grip evenly and wear longer. Specify Gates Vulco Rope — the V-belt with concave sides. The Gates Rubber Co., Denver, Colorado — *World's Largest Maker of V-Belts.*

There are Gates Engineering Offices and Distributor Stocks in all industrial centers of the United States and Canada, and in 70 other countries throughout the world.

TPA 109A

Gates

Gates Vulco Rope Drives

Equipment News *(Continued)*

plastic slide. Using an individual's income as a base, an operator moves the slide, locates the income and in adjoining boxes finds the correct tax deductions.

WHEEL BLOCK—A wheel block designed for tires up to 60 in and loads in excess of 50 tons without failure has been introduced by the Calumet Steel Castings Corp., Hammond, Ind. Designated WB16, the block is constructed of cast steel and weighs some 40 lb.

COMMERCIAL BATTERY—Longevity and added power are the features of General Tire & Rubber's new commercial battery. The battery reportedly will give "lightning starts" to diesel, gasoline engines in light to heavy trucks and buses. Dubbed the "Super Expressway," the battery's life expectancy is 43% higher than the former product.

TUBE FITTING TOOL—A Parker "ferulset" tool for pre-setting Ferulok flareless tube fittings is made by the Tube & Hose Fittings Div., Parker Appliance Co., Cleveland 12, Ohio. The tool is mounted in a vise and expedites pre-setting of a fitting ferrule onto a metal tube.

PLASTIC PIPE—Easton Plastic Products Co., Inc., 233 Broadway, New York 7, N.Y., is making its rigid (unplasticized) PVC pipe in standard pipe sizes from ¼ in to 6 in. Corrosion and chemical resistant, the pipe is one-sixth the weight of steel, can be sawed, threaded, welded, cemented, machined and formed.

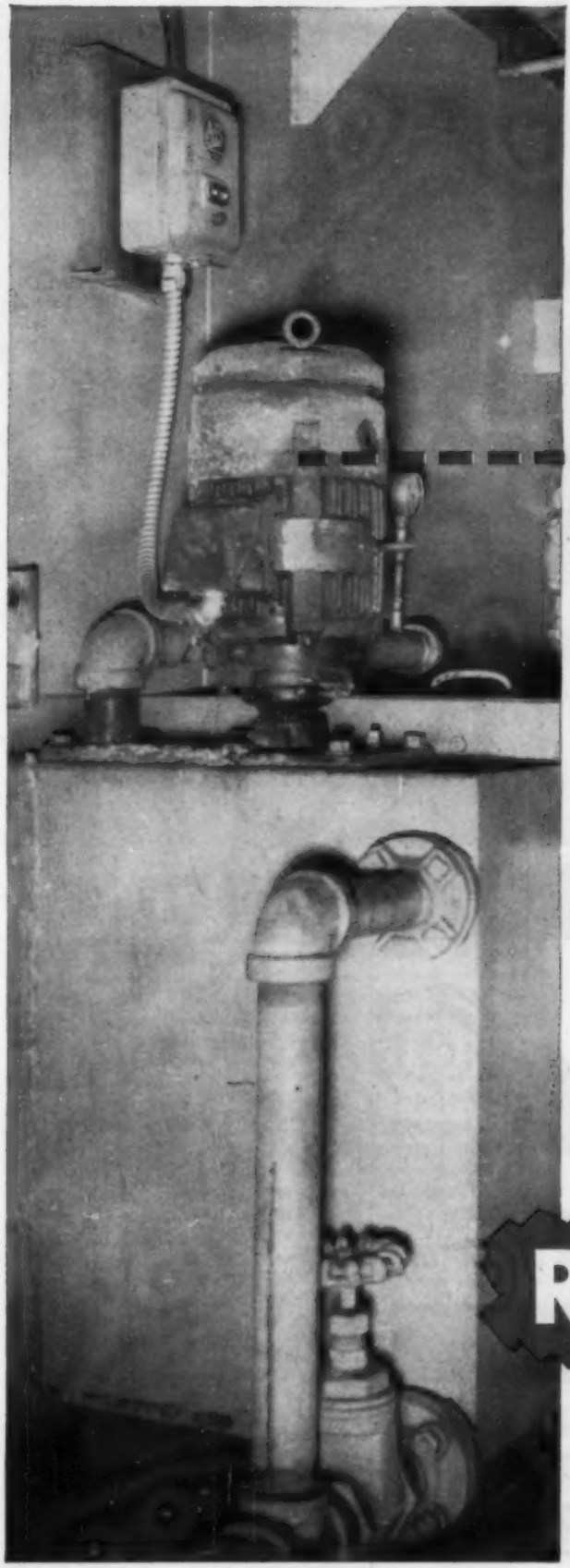
IRON POWDER ELECTRODE—All-position welding and a fast deposition rate have been combined in Murex Speeded R by the Metal & Thermit Corp., Rahway, N.J. The iron powder electrode thus reduces time, labor and difficult operations, all primary cost factors, according to the company.

Free Bulletins

ELECTRIC MOTORS – "Tri-Clad" 55 motors, 1 to 5 hp, drip-proof and enclosed, are featured in Bulletin GEA-5980 by General Electric Co., Schenectady 5, N.Y. Production testing techniques and motor construction are illustrated. In addition, reported servicing and installation advantages are explained.

TANK AND BIN WEIGHING SYSTEMS—Numerous arrangements of the Emery tank and bin weighing systems are published in Bulletin 561 by the A. H. Emery Co., New Canaan, Conn. The company's "package," which includes an instrumentation selection of eight different manufacturers, plus the Emery cell, is described in detail.

CONTROL TRANSFORMER LINE—Bulletin GED-2767A, published by General Electric Co., Schenectady, 5, N.Y.,



RELIANCE solves motor corrosion problem

This Reliance Corrosion-Proof Motor is operating a pump which circulates cleaning solution through a tank containing metal parts. The motor is subjected to corrosive vapors and liquids each time a basket of parts is removed. BUT THIS MOTOR WILL NOT CORRODE.

The solid cast-iron housing, including the fan cover, will withstand corrosive service indefinitely. Wiring identification is preserved on a stainless steel name plate. A threaded outlet is provided on the water tight conduit box, and motor leads are molded into a neoprene gasket that completely seals off the windings from the conduit box. A neoprene or non-ferrous shaft slinger seals the only other frame opening.

These and many other features give you a motor with a built-in corrosion protection. Why not install this superior design now and save many replacement dollars in the years ahead.

Write for bulletin B-2406 for complete design details.

B-1634

RELIANCE ELECTRIC AND ENGINEERING CO.

DEPT. 61A, CLEVELAND 10, OHIO
CANADIAN DIVISION: WELLAND, ONTARIO

Sales Offices and Distributors in Principal Cities

VICTAULIC®

METHOD OF PIPING

VICTAULIC HAS EVERYTHING...

VICTAULIC COUPLINGS
Simple, fast, reliable. *Styles 77, 77-D,* for standard uses with steel or spiral pipe, — *Style 75* for light duty. Other styles for cast iron, plastic and other pipes. Sizes ¾" to 60".

ROUST-A-BOUT COUPLINGS
For plain or beveled end pipe *Style 99.* Simple, quick, and strong. Best engineered and most useful plain end coupling made — takes a real "bull-dog" grip on the pipe. Sizes 2" to 8".

VICTAULIC SNAP-JOINTS
The new, boltless, speed coupling, *Style 78.* Hinged into one assembly for fast piping hook-up or disassembly. Hand locks for savings in time and money. Ideal for portable lines. Sizes 1" to 8".

COUPLINGS FOR EVERY PIPING JOB

VICTAULIC FULL-FLOW FITTINGS
Elbows, Tees, Reducers, Laterals, a *complete line*—fit all Victaulic Couplings. Easily installed — top efficiency. Sizes ¾" to 12".

VIC-GROOVER TOOLS
Time saving, on-the-job grooving tools. Light weight, easy to handle — operate manually or from any power drive. Sizes ¾" to 8".

PLUS FITTINGS AND GROOVING TOOLS

"EASIEST WAY TO MAKE ENDS MEET"

Promptly available from distributor stocks coast to coast.
Write for NEW Victaulic Catalog-Manual No. 55-A-1.

VICTAULIC COMPANY OF AMERICA
P. O. BOX 509 • Elizabeth, N. J.

Equipment News *(Continued)*

contains voltage ratings, frequency, frame size, weight and application for autotransformers, control panel and machine tool transformers. Included are wiring diagrams and voltage regulation curves for use in selecting a transformer for a given application.

TWO-WAY RADIO—General Electric's Communication Equipment Section, Syracuse, N.Y., gives details on printed circuitry, interchangeable components, cabinets and mounting for its "Progress Line," of 450-mc, two-way radios. Bulletin ECR-380-A.

PLUG VALVES—Lubricated plug valves manufactured by the Homestead Valve Mfg. Co., Coraopolis, Pa., are described and illustrated in Reference Book 39, Section 5, a new booklet published by the company. Shown are 100% pipe area valves, venturi, round port and diamond port valves for 150-lb steam working pressure, 200-lb oil-water-gas, and ASA 150- and 300-lb classes.

CRANE EXCAVATOR—Bulletin C-101, a 4-pager published by the Schield Bantam Co., Waverly, Ia., covers the crawler-mounted, ⅜-cu yd, 5-ton, C-35 crane-excavator. Each section of the crane-excavator is described and illustrated through "breakdown" photos accompanied by texts and specification charts.

WELDER'S WALL CHART—The "Select-Tic," a welding shop wall chart numbered TIS 2616 and published by the Technical Information Service, Eutectic Welding Alloys Corp., 40-40 172nd St., Flushing 58, N.Y., contains torch and arc welding applications for cast iron, copper and copper alloys, stainless steels, nickel and nickel alloys, aluminum, impact wear and corrosion resistant overlays.

PROTECTED AC MOTORS—"Total Protection," reportedly a new concept in protected enclosures for industrial AC motors advanced by Reliance Electric & Engineering Co., 1088 Ivanhoe Rd., Cleveland 10, Ohio, is explained in Bulletin B-2501, published by the company. Cutaway views of a motor and its components are designed to show how the motor fits applications that formerly required drip-proof or splash-proof motors.

PROCESS CONTROL INSTRUMENTATION—Fischer & Porter Co. is distributing Catalog 2, which lists the company's general stock of process instrumentation. Included are prices on recording, controlling and transmitting instruments for flow, pressure, and density. 907 Jacksonville Rd., Hatboro, Pa.

MINING BITS—"Carmet Mining Tool Catalog & Methods Manual," a 16-p booklet published by the Advertising Dept., Allegheny Ludlum Steel Corp., 2020 Oliver Bldg., Pittsburgh 22, Pa., contains detailed descriptions and blueprints of each mining bit manufactured

an ACCO product

American Cable TRU-LAY VHS 15% STRONGER

33% Longer Wear with VHS Shovel Hoist Ropes

Lester Van Alystyane, Superintendent of The Callanan Road Improvement Company, Kingston, New York says: "Quarrying operations are rough on shovel hoist ropes. The best Improved Plow Steel shovel hoist ropes we could buy for our 120-B Bucyrus-Erie shovel used to last for about 250 thousand tons of rock. When we switched to new TRU-LAY VHS the life of our ropes jumped over one-third—now we get 325 to 350 thousand tons per rope.

"The new VHS seems to take the shocks better than any other rope we have used. And it saves us money on 'down time' and loss of production."

New VHS is setting new records like this in hundreds of applications—as shovel hoist ropes, scraper and dozer cables and draglines. Made from a new grade of steel for wire rope, it is at least 15% stronger than IPS—the strongest grade formerly available.

Handle Heavier Loads—With Higher Safety Factor

This extra strength means you can safely handle heavier loads with the same diameter line. And you get a higher factor of safety during the entire period of operation.

Tougher

And, in addition to its greater strength, new TRU-LAY VHS is tougher. It was developed especially for the toughest applications—draglines, shovel hoist ropes, scraper and dozer cables. It thrives under the abuse wire rope necessarily gets in these punishing services.

Cuts "Down Time"—Lowers Cost

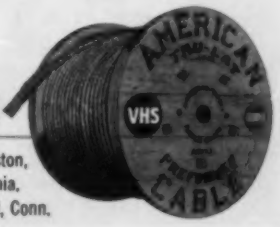
Because it is stronger and tougher, new VHS lasts longer in these tough applications. This saves money. And you make additional savings by reducing the amount of "down time" necessary for wire rope replacement.

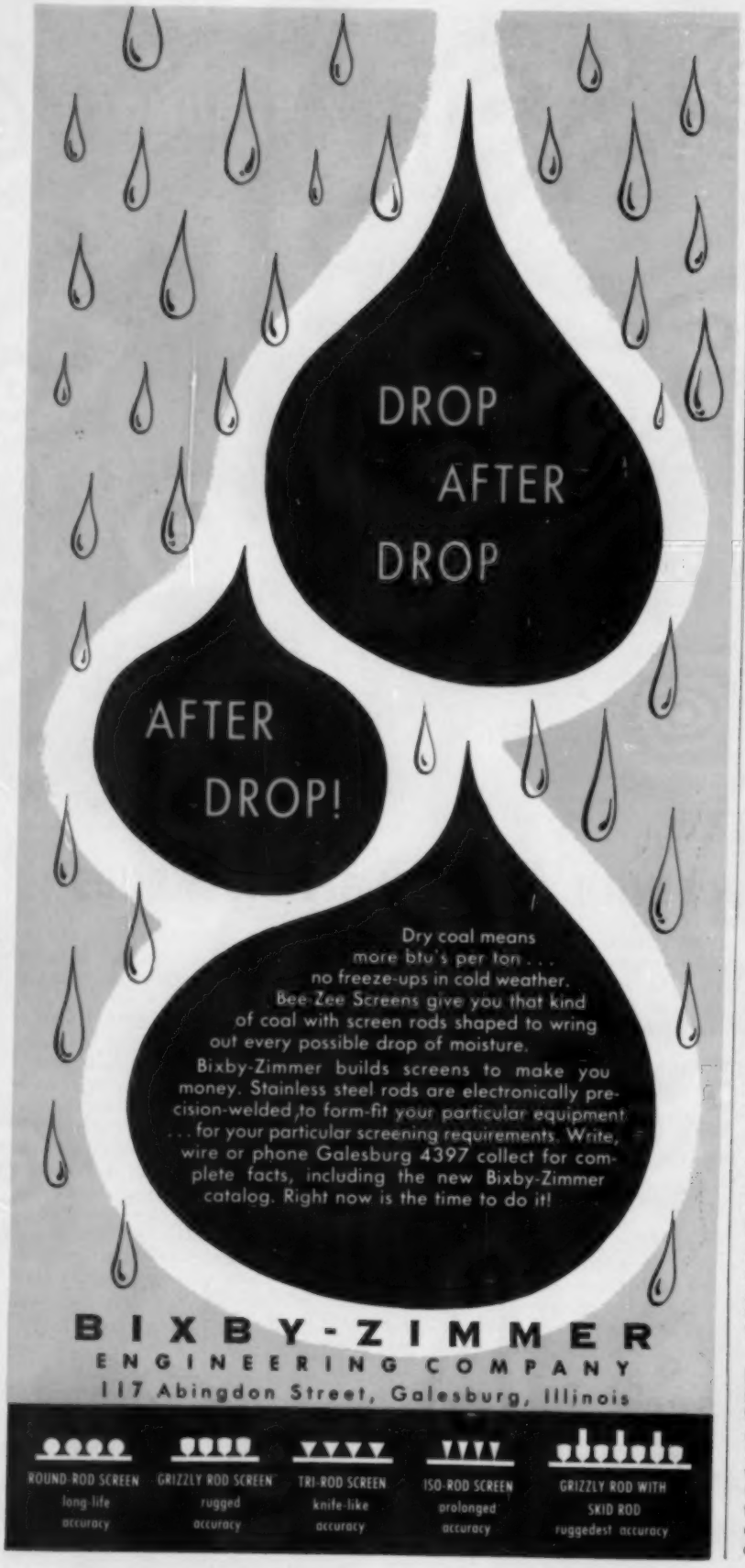
Your American Cable distributor has draglines, shovel hoist ropes and scraper and dozer cables of new TRU-LAY VHS in stock now. You don't need any complicated specifications to order them. Just call him today and tell him the size and diameter you want.

See your American Cable Distributor or write to the nearest American Chain & Cable Company Office

ACCO American Cable Division
AMERICAN CHAIN & CABLE

Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Houston, Los Angeles, New York, Odessa, Tex., Philadelphia, Pittsburgh, Portland, Ore., San Francisco, Bridgeport, Conn.





Equipment News *(Continued)*

by the Carmet Div. Included are mining bits for straight shank cutter bits, milled shank cutter bits, forged shank and special shank cutter bits.

SELECTING AN AC MOTOR—As an aid to AC motor users the Reliance Electric & Engineering Co., 1088 Ivanhoe Rd., Cleveland 10, Ohio, is supplying the "Reliance Motor Selector," a bulletin containing such data as speed-frequency relationship, NEMA design classes, torque characteristics, NEMA current and torque value and frame selection tables.

TUBE-WORKING TOOLS—Tube & Hose Fittings Div., Parker Appliance Co., 17325 Euclid Ave., Cleveland 12, Ohio, has issued Catalog 1140, which contains a comprehensive listing of tube-fabricating hand tools e.g. cutters, flarers. Other listings contain bench-mounted benders, straight thread tapping and counterboring tools.

ELECTRIC MOTORS—Lincoln Electric Co., Cleveland 17, Ohio, features "Multigard" protection for its squirrel-cage motor types claiming that "Multigard" insulation "duplicates many of the benefits of totally enclosed and splash proof motors." In a bulletin on "Linc-Weld" motors, the company explains its motor construction with "Multigard" insulation, a plastic sealing compound.

TELESCOPING HOISTS—Galion All-steel Body Co., Galion, Ohio, is distributing a catalog in which are illustrated nine hydraulic truck hoists, both single front-mounted and twin front-mounted. Payload capacities are from 9 to 34 tons. Matching dump bodies are shown.

PLASTIC STEEL—Bulletin NI-102, distributed by the Devcon Corp., Danvers, Mass., suggests methods of using its metal repairing kit in which a formula of 80% steel and 20% plastic, which can be worked as modeling clay, is used to repair such equipment as jigs, molds, models, dies, machinery, pipes.

STORAGE BATTERIES — "Compact Power by Yardney" is a booklet in which the Yardney Electric Corp., 40 Leonard St., New York 13, N.Y., describes its lines of "Silvercel" (silver-zinc) and "Silcad" (silver-cadmium rechargeable storage batteries. Included is information on available cells and batteries varying in size from a fraction of an ampere hour to many thousands of ampere hours.

FANS—The "Axial Airfoil" fans manufactured by the Chicago Bower Corp., 9863 Pacific Ave., Franklin Park, Ill., are described in detail in Bulletin AA-102. Eight different fans are included with charts, tables and illustrations. Fourteen fan wheels with diameters from 12 to 72 in are listed. The fans are capable of moving from 1,200 to 100,000 cu ft of air each minute.

3 shovels,

10 trucks,

23 stone stockpiles,

2 waste dumps...

1 tractor handles all cleanup

Too big for shovel to handle, these limestone chunks are dozed into worked-out sections of the pit. Four-wheel drive, 208 hp give tractor plenty of power to push up to 2½ cubic yards (5½ tons) per pass.

Tournatractor can switch up to 10 rail cars at once. Low-pressure tires do no damage to rails, ties, or paved surfaces. Supt. J. M. Christopher reports this unit requires "much less lubrication and considerably less maintenance than crawler-tractors formerly used."

For 100 years, the East St. Louis Stone Company and its predecessors have been quarrying limestone from a pit near Belleville, Illinois. For 100 years, they have dug in different directions, until, today, load areas are far apart and on levels varying from near-surface to over 225 ft. below surface. Three shovels and ten 11-ton trucks are now used to remove about 750,000 tons of stone yearly.

Suppose you were running this big job. Suppose you had to contend with its widely-scattered loading sites, its network of haul roads, and its steep grades. How many tractors would you ask for to do the "housekeeping" chores? How many to handle shovel cleanup? How many for haul road maintenance? Dump cleanup? Stockpiling? Emergency work?

East St. Louis Stone Company's Superintendent, J. M. Christopher, has what you'll probably agree is the most efficient answer possible. He is using *one tractor to do it all!* His choice is a high-speed rubber-tired Tournatractor.

Travels 1670 feet in 1 minute

This mobile unit "runs" from job-to-job at speeds to 17 mph. It dozes at speeds up to 8 mph. "We sure like its ability to go fast from one place to another," says Mr. Christopher. Its regular assignments, scattered 0.1 to 1.5 miles apart, include:

1. Cleans pit floor around all 3 shovels (1½, 2 and 2½ yds. in size). Works at each shovel two or three times per 8-hour shift. Besides ordinary cleanup, dozes over bank any rock chunks too big for shovel to handle. Typical 150 ft. to 200 ft. one-way push takes one minute . . . backup same distance takes half a minute.
2. Cleans shot stone after blasting at each of the 3 locations.
3. Moves large Joy drill around pit.
4. Levels and cleans around crushed stone stockpiles once or twice a day.
5. Levels waste dump once a day. Material mostly clay mixed with limestone. Tournatractor dozes up to 2½ cubic yards per pass.
6. Blades haul roads for the 10 trucks about once a day.
7. In emergencies, switches railroad cars. Can push 3 full cars (total weight, approximately 240 tons) or 10 empties.

Tournatractor can offer you the same high-speed, low-cost production for your work. Write for details. Ask, also, about the new double-duty SwitchTractor, the coupler-equipped go-anywhere tractor for on or off-track service.

Tournatractor—Trademark Reg. U. S. Pat. Off. T-787-G-b

LeTourneau-WESTINGHOUSE Company, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

WHERE QUALITY IS A HABIT

NEWS ROUND-UP

More Reserve Ships May Begin Hauling Coal

More reserve fleet ships are slated to enter the coal hauling trade. Recently Maritime Examiner C. W. Robinson recommended that some 69 ships be chartered to 12 ship operators. Final approval of the charter requests is expected within the next few weeks. In all, shipping companies asked for 150 ships, but the examiner restricted his recommendation to companies that already had agreements to move coal. Most of the ships will be used to haul coal to Europe, with about 40 of them due to take coal to France. Testifying in support of the request for ships, George Roussel, U. S. representative of the French government coal importing agency (ATIC), told the federal maritime examiner that lack of available ships to haul U. S. coal to France had recently forced French utilities to parttime operations.

And, where it is now costing from $14 to $16 a ton in ocean freight rates to deliver coal to France, Roussel said he had entered into agreements with several of the operators to haul it for $11.75 a ton if they got government ships. Robert T. Merrill, chief of the shipping division of the State Department, supported the request for use of reserve fleet ships and blasted the high price of hauling coal as a detriment to the European economy. Merrill warned that the shortage of ships to haul coal and the resulting high freight rates "may well jeopardize the export market for coal which, on a continuing basis, depends on our ability to deliver large tonnage at stable and competitive rates."

Final approval by the government to release the 69 ships would make over 100 such ships that have been approved for use in hauling export coal. The biggest single block up to now was 30 ships okayed for use by American Coal Shipping, Inc. So far, however, ACS has not put any of its government-chartered ships into service and reportedly has less than 10 in yards being readied for service. Labor disputes have accounted for some of the delay in getting the ships into operation.

Government approval for the use of reserve fleet ships doesn't always mean they will actually go into service. Many companies that have received the okay to use reserve fleet ships are slow to get them in operation, and sometimes cancel the request entirely. Traditionally, shipping companies come in with requests when they think reserve fleet ships are

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USBM Approves Lighting Systems for Gassy, Dusty Mines

Two commercially made lighting systems for use in gassy or dusty coal mines have been approved by the U. S. Bureau of Mines. The fixtures of the two approved systems each "take advantage of the intrinsic safety of fluorescent tubes when used in an instant-start circuit," the bureau reports. The tubes are approximately 18 in high, 6 in in diameter. Each system has two 14-w fluorescent lamps mounted side by side within a transparent plastic tube. Hung vertically, the lights are spaced at 18-ft intervals.

A magnetic lock prevents unauthorized replacement of lamps or tampering, and a short cable and special plug on each fixture permits lights to be added as mining advances. During the USBM tests, the lights were purposely broken in atmospheres containing explosive concentrations of both gas and coal dust, but no explosions occurred. One approval covers a two-wire distribution system which is isolated from all other mine circuits. It uses 120-v AC. The second covers a three-wire distribution system, with the third wire used for grounding.

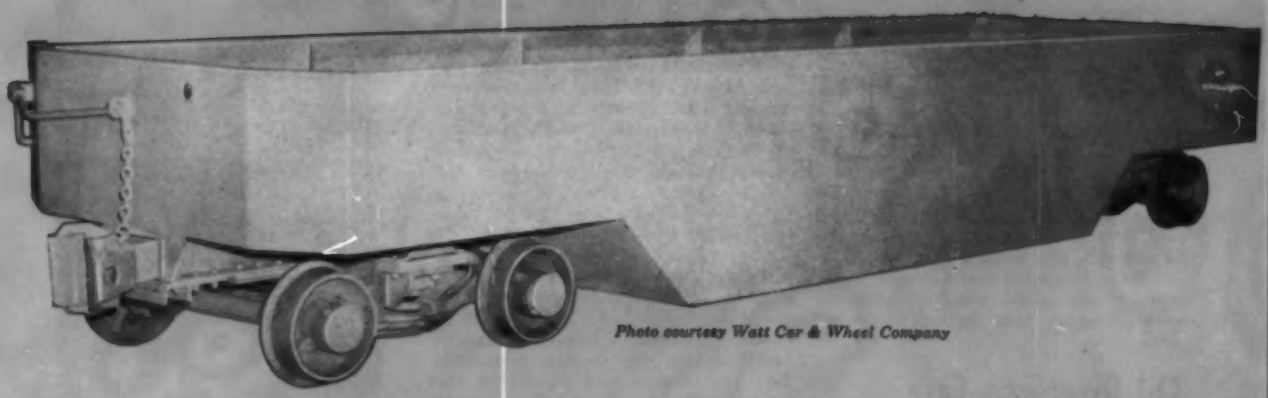


Photo courtesy Watt Car & Wheel Company

Barnes and Tucker Company continues to specify

NATIONAL

equipment for all 8-wheel mine cars

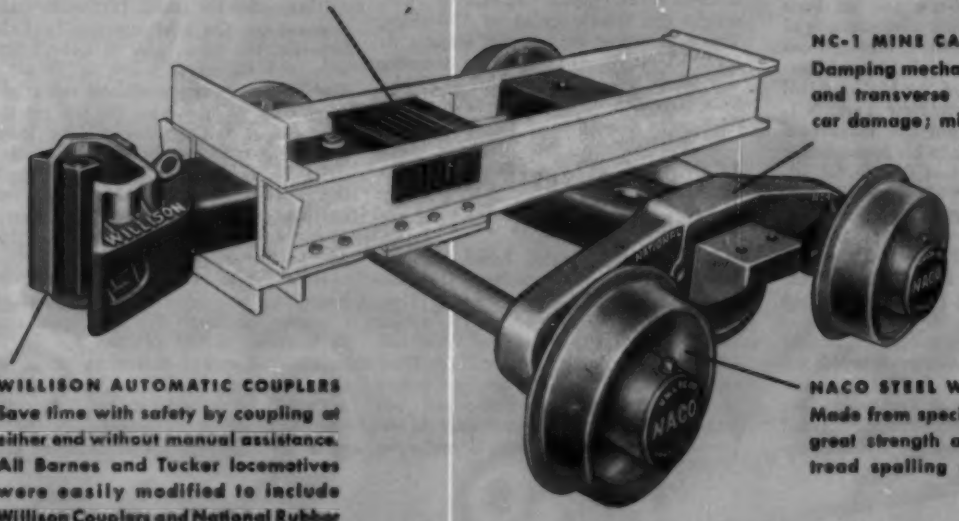
On its latest order for 100 eight-wheel Watt mine cars, Barnes and Tucker Company's Lancashire No. 15 Mine specified National equipment *throughout*. This includes National NC-1 trucks, Naco Steel Wheels, Willison Automatic Couplers, and National Rubber Cushioning devices.

This latest re-order makes—*and keeps*—the entire fleet of rotary-dump cars *100 percent National equipped*. And this means that the Barnes and Tucker Mine has one of the most modern fleets of mine cars in existence. *Modern* because the cars are safe to operate at high speeds . . . *modern* because they are efficient and minimize spillage . . . *modern* because they will continue to keep maintenance costs low.

Think of tomorrow today . . .
and modernize your cars the National way.

NATIONAL
MALLEABLE and STEEL **CASTINGS COMPANY**
Cleveland 6, Ohio

NATIONAL MI-230
All National Rubber Cushioning devices provide soft initial action, high absorption, and maximum protection.



NC-1 MINE CAR TRUCK
Damping mechanism controls vertical and transverse oscillations; reduces car damage; minimizes spillage.

WILLISON AUTOMATIC COUPLERS
Save time with safety by coupling at either end without manual assistance. All Barnes and Tucker locomotives were easily modified to include Willison Couplers and National Rubber Cushioning devices.

NACO STEEL WHEELS
Made from special Naco cast steel of great strength and ductility; reduce tread spalling or flange breakage.

going to be available. Then, they do the hard figuring over costs as the matter progresses. It costs around $100,000 to take a ship out of the reserve fleet and put it back. This must be paid for by the company during the first year.

Charters, too, are reviewed by the government annually and con be cancelled by either part on fairly short notice. The result is that ship operators are faster to ask for ships than they are to actually put them in service. And, too, the government doesn't run an open counter and allow ship operators to come in at any time and ask for ships.

Oil Diversions Ease U.S. Import Problem

As oil imports declined sharply last month the cause of the decline—diversion of Middle East supplies to Europe—solved a number of problems. In Europe, especially Britain and France, the diversion meant some relief from the severe shortage. To importers in the United States, besides a fat and ready market, it meant relief from the near-monthly requests of Dr. Arthur S. Flemming, director of defense mobilization, to cut imports voluntarily. To Dr. Flemming, who had pleaded, cajoled and threatened during ineffective attempts to persuade importers to reduce their quotas, Suez and its resulting oil stoppage meant release from a looming need to impose a get-tough policy; i.e., quotas.

Obviously reluctant in 1956 to saddle the importers with controls (under the 1955 Trade Agreements Act), Dr. Flemming disclosed last month that he had been on the verge of doing just that, but the Mideast crisis had made the need for controls "academic." The ODM director said that just prior to Suez administration fact finders had concluded that present and planned rates of oil imports would have constituted a threat to national security. As a representative of the President Dr. Flemmings is empowered to impose quotas after investigation. Such import quotas would have been the first imposed on oil in the United States.

Now the Mideast crisis has cleared up the clogging importing situation here. During one week in December, for example, crude oil imports averaged 1,226,500 bbl. a day—a sharp decline of 457,900 bbl a day when compared with the preceding week's 1,684,400 bbl. But, what will happen in the United States when the Suez Canal is cleared and oil again flows freely to Europe is uncertain. Dr. Flemming again may be faced with the identical problems after perhaps only for a few months of grace.

Donald C. McGraw Jr. Heads *Coal Age* Sales

Donald C. McGraw Jr., has been appointed advertising sales manager of *Coal Age, Engineering & Mining Journal*, and *E&MJ Metal & Mineral Markets*, publications of the McGraw-Hill Publishing Co., Inc., New York, N.Y. Mr. McGraw joined the magazines' staffs Jan. 1. Prior to his appointment he had been assistant director of advertising sales for McGraw-Hill and, before that, associate manager of the company's eastern district. He became actively associated with McGraw-Hill in August, 1950, filling a job as advertising salesman. Before that he had worked for the G. M. Basford Co., an advertising agency, and for the *Flower Grower*. Mr. McGraw attended the College of William & Mary and the Carnegie Institute of Technology. He was on active duty with the United States Naval Reserve for 4 yr.

Exports Seen Rising Billion Tons Monthly

Eisenhower administration officials were estimating late last month that 1 million tons of bituminous coal could be added to monthly export shipments to Europe. The amount, it was believed, would meet European house heating and industrial deficiencies caused by the Suez Canal closing. The State Dept. and some coal shipping executives already have asked the Federal Maritime Board to release vessels from the reserve fleet to meet European coal demands. Twenty steamship companies have, in fact, sought the release of about 150 ships. The government says it will confine its own role to backing the coal industry and making the reserve ships available. This follows a pattern laid down in the emergency shipments of oil abroad.

ICC Authorizes Rails To Raise Freight Rates

Higher freight rates faced shippers this month with the authorization by the Interstate Commerce Commission Dec. 28 of a general increase of 7% within Eastern Territory, 5% in the West and 5% interterritorially between East, West and South. No increases between points in the South had been authorized, but southern carriers were not due to be heard until January. For coal and coke a flat increase of 10¢ per net ton was authorized with some exception. Lignite line-haul rates moved up 5¢ per net ton, and the flat 10¢ increase will apply on tidewater rates to the North Atlantic ports for Inside Harbor or Cape destinations. On coal moving to Lake Superior, the west bank of Lake Michigan and Canadian ports on Superior, 5½¢ has been authorized. All other lake cargo coal will move up 10¢ per net ton on the first rail movement. The lower 5¢ increase will also be applied to other rail-water movements. On coal originating at river mines and with no previous rail haulage to the water the rail movement ex-river will be subject to a 10¢ net ton increase.

How much of an increase will be levied on coal destined for export is unknown, although the ICC authorized an increase of 10¢ per net ton on all export coal except that from mines on the Chesapeake & Ohio. The C&O had not asked for an increase, but is reported contemplating a 5¢ boost. The other roads, i.e., the N&W and Virginian may

Daniel Jackson, Jr. Joins *Coal Age* Staff

Daniel Jackson, Jr., McAlpin, W. Va., former chief electrician of Winding Gulf Coals, Inc., Tams, W. Va., joined the staff of *Coal Age* last month. Mr. Jackson, as an assistant editor, will specialize in the electrical and maintenance fields. A native of Logan County, W. Va., Mr. Jackson attended the Dept. of Electrical Engineering, West Virginia University, College of Engineering. He interrupted training in 1943 to serve in the Navy, but resumed classes in 1946 after receiving his discharge. That same year he accepted a part time job with the Guyan Eagle Coal Co., No. 1 mine, Amherstdale, W. Va. In 1950 he began working full time for Guyan Eagle. A year later he joined the staff of Amherst Coal as an electrical-mechanical inspector, Buffalo Creek Div. By 1954 he had become chief electrician of the company's Lundale mine. He joined Winding Gulf Coals in August, 1956.

"Much less down time than any other equipment I've ever owned"

The CAT* D13000 Engine in this Gardner-Denver compressor operates more economically than the gasoline engine-driven compressor it replaced and has twice the air capacity. It is owned by Roberts Coal Co. of Gallup, New Mexico, which also has a Caterpillar D8800 Electric Set furnishing power for the screening plant. "I've found that Caterpillar equipment is more dependable and has much less down time than any other I've ever owned," says Earl Roberts, owner. He operates the only coal strip mine in the state, producing 200 to 250 tons daily.

Excellent though this performance is, there's a new line of Caterpillar Diesel Engines and Electric Sets that are designed to do more work at even lower cost. The new D342, for example, replaces the D13000. It is a 210 HP (maximum output capacity) engine of compact, six-cylinder design. It operates without fouling on inexpensive, non-premium fuel such as No. 2 furnace oil. Like all Caterpillar Diesels, its four-cycle simplicity means that there are no cylinder ports or air boxes to clean. And it has such Caterpillar long-life features as highly effective fuel, oil and air filtration, "Hi-Electro" hardened cylinder liners and crankshaft, and aluminum alloy bearings.

There is a full line of Caterpillar Engines to 650 HP (maximum output capacity). Leading manufacturers can supply these rugged yellow units in their compressors, excavators and other coal mining equipment. Your Caterpillar Dealer can give you details—and help you select an engine if it's time to repower. See him soon, and count on him for dependable service and parts you can trust.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

MODERN HEAVY-DUTY POWER

be readying a 5¢ increase, only half of the amount permitted. Northern lines, meanwhile, were expected to apply the full 10¢ increase authorized.

By Dec. 28 the rate on bituminous coal shipped to Baltimore, Philadelphia and New York for export had been increased 5c. On Hampton Roads coals no increases had yet taken effect.

FPC Examiner Approves Keystone Gas Proposal

Brushing aside all arguments by the Anthracite Institute, eight railroads and the UMWA Fuels Research Council, a Federal Power Commission examiner last month approved new natural gas service for Pennsylvania's anthracite region. The examiner, Richard N. Ivins, told Tennessee Gas Transmission, Houston, Tex., that it could sell gas to the Scranton-Spring Brook Water Service Co., Wilkes-Barre, Pa. "Although natural gas may displace a certain amount of coal," the examiner said, "the over-all benefits to be derived by the public as a whole clearly outweigh any detriment that may result to the coal intervenors or to any other affected group."

Scranton-Spring Brook Water Service plans to use the natural gas to replace artificial gas it now sells to its retail customers. Opponents to the proposal, which is subject to review by the full Federal Power Commission, argued that the proposal would result in natural gas being brought from Texas, Louisiana and even Canada into the heart of the anthracite producing area.

Anthracite Up-Trend To Continue, Says Earnest

A forecast for continued good signs in the anthracite industry was made by F. W. Earnest Jr., president of the Anthracite Institute, Dec. 27. In a year-end statement of optimism, Mr. Earnest pointed out that 1956 product and sales had justified his prediction of a year ago. He said, "As the industry faces 1957, the plus signs definitely outweigh the minus signs and it is our opinion that the upward trend in anthracite affairs, which started in 1956, should continue during 1957."

Mr. Earnest outlined six factors which have been responsible for increased anthracite production and sales during 1956: 1) increased overseas exports, 2) increased weather demand, 3) increased use in the sintering of iron ore, 4) increased use in the manufacture of coke, 5) increased used in the pelletizing of taconite ore, and 6) increased use by electric utilities. With the exception of the weather factor, Mr. Earnest said, it is confidently believed that all factors will continue to show increases during 1957.

Text of the year-end message by Mr. Earnest:

Current Coal Patents

No. 2,769,537

PRODUCTION OF HIGH-GRADE PRODUCTS, ESPECIALLY FUELS, FROM RAW MATERIAL CONTAINING PIT COAL OR BROWN COAL, W. Reerink, W. Muschenborn. and E. Notzold (assigned to Berwerksverband Zur Verwertung Von Schutzbrechten der Kohlentechnik G. m. b. H., Dortmund-Eving, Germany), Nov. 6, 1956—A process for upgrading impure coals and for recovering from washing plant sludges the finest fractions of crude coal. The crude material, pre-crushed if necessary, is thoroughly mixed in a kneading apparatus with an oil-containing substance, such as oil or tar, and dispersed in water. The suspension is separated by centrifuging or other mechanical means into a coal concentrate and waste particles suspended in water. The recovered oil-wetted coal concentrate is a high-quality fuel, and the waste particles in solution can be utilized for the manufacture of porcelain or portland cement, as a filler, etc.

No. 2,769,538

PROCESS FOR FROTH FLOTATION DRESSING, W. Reerink, W. Muschenborn, and E. Notzold, Nov. 6, 1956—An improved froth flotation method for beneficiating coal slimes and other coal-containing materials. The mixture of finely ground raw material and flotation reagents is subjected to pressures other than atmospheric, either in tanks or by being forced through narrow slits, nozzles, or the like. The more intimate reaction thus effected between reagent and raw material makes possible the use of smaller quantities of reagents than formerly were required.

No. 2,769,627

LOOP CUTTER CHAIN GUIDE AND DRIVE STRUCTURE, J. F. Joy (assigned to Joy Manufacturing Co., Pittsburgh, Pa.), Nov. 6, 1956—A design for an improved guide mounting and drive structure for the endless loop cutter chain of a coal mining apparatus of the "square face" loop cutter type.

No. 2,770,052

METHOD AND APPARATUS FOR DRYING TREATMENT OF SOLIDS IN THE FLUIDIZED OR GAS ENTRAINED STATE, R. L. Morrison (assigned to Silver Engineering Works, Inc., a division of Silver Corp., a corporation of Colo.), Nov. 13, 1956—An improved method and apparatus for drying solid materials, especially finely divided coal, by fluidized means. The material is entrained in a rising column of heated gas whose rate of movement is controlled so as to effect maximum removal of surface moisture without destructive coal distillation.

No. 2,770,378

SCRAPER LOADER APPARATUS FOR MINES, T. F. McCarthy (one-tenth assigned to Goodman Mfg. Co., Chicago, Ill.), Nov 13, 1956—A design for an efficient scraper loader apparatus for use in cutting and loading out a coal face.

No. 2,770,448

EXTENSIBLE ROTARY CUTTING BAR FOR BORING TYPE MINER, F. B. Miller (assigned to Goodman Mfg. Co., Chicago, Ill.), Nov. 13, 1956—Retractable cutter bars for use with a coal mining machine of the boring type that will produce a substantially rectangular entry, to facilitate maneuvering with the machine.

No. 2,770,449

BORING AND BREAKER HEAD FOR SLACK COAL, V. J. McCarthy (assigned to The Salem Tool Co., Salem, Ohio), Nov. 13, 1956—A rotatable boring head to be connected to the forward end of an auger machine used for boring a coal seam. This breaker head comprises a plurality of triangular fins and cutting bits, and is designed for breaking the coal into relatively small particles, on the order of slack.

No. 2,770,536

METHOD FOR GASIFICATION OF SOLID FUELS, S. W. Walker (assigned to Stanolind Oil & Gas Co., Tulsa, Okla.), Nov. 13, 1956—A process for producing fuel gas or synthesis gas from bitumnous coal, lignite, coke, or the like. The raw material is broken into small lumps passing a 3-mesh screen, mixed with steam or oxygen, and injected into the combustion zone of a gas generator. Combustion conditions are controlled so as to achieve maximum conversion of carbon into carbon monoxide.

No. 2,771, 264

PIT PROP, J. Handley (one-half assigned to J. N. Brown, London, England), Nov. 20, 1956—A design for a readily adjustable mechanical prop for use in coal mines. The device makes use of a screw having a quick lead that will run down unless braked by clamping with a divider nut. The nut can be set to withstand any predetermined pressure.

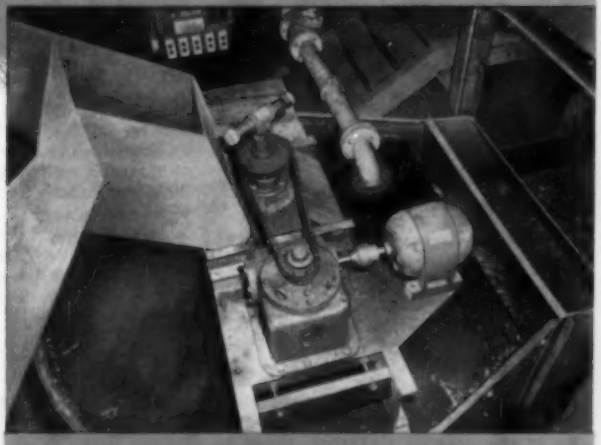
No. 2,771,271

DUST COLLECTOR FOR DRILLS, E. Lawson, Sr., Nov. 20, 1956—A dust-collecting device designed for use with a drill for the purpose of removing the dust and cuttings adjacent to the mouth of the drill hole. The apparatus is especially valuable for cleaning dust from coal faces being drilled, since coal dust is a safety hazard due to its inflammability.

MEMO: To All Bituminous Coal Men

WILMOT ENGINEERING CO.

Hydrotator Cleaners are Now Built and Sold by Wilmot



Above, Wilmot Hydrotator; cleans bituminous down to 10 M. Below, Hydrotator-Classifier; cleans 10M x 0. Completely automatic.

Ask about the Automatic Controls and Other Wilmot Patented Features that Make 1957 Hydrotators a Near Approach to . . .

PUSH-BUTTON PREPARATION

Following the recent acquisition of certain patents from the original developers of the Hydrotator principle, Wilmot Engineering Co. has assumed the complete responsibility for the engineering, manufacture and sale of Hydrotator coal cleaning units in the U. S. A. In recent years Wilmot has developed and patented several improvements in automation and accuracy of regulation which have earned present-day Hydrotators recognition as a near approach to "push-button" preparation. We have substantially enlarged our development and research facilities to the end that Hydrotators shall continue to represent the most advanced engineering in coal preparation methods.

W WILMOT

WILMOT ENGINEERING CO.

WHITE HAVEN, PA.
Exec. Offices:
HAZLETON, PA.

HUNTINGTON, W. VA.: PO Box 1831, Phone JAckson 5-2571

Text of F. W. Earnest Message
Story begins on p 124

Commercial production of all sizes of anthracite, including non-union production, will approximate 26,700,000 tons in the calender year 1956, representing an increase of 1,600,000 tons or 6.4% over 1955 production figures.

Anthracite sales, as well as production, have also shown an increase in 1956. The first eleven months' sales of anthracite, at the producer level, have amounted to 24,810,000 tons, compared with 23,330,000 tons for the comparable period of 1955, representing an increase of 1,480,000 tons or 6.3%.

Accounting for this gratifying increase were the following factors:

(1) Increased overseas exports. They are estimated to have exceeded 1955 figures by at least 1,700,000 tons or 265%.

(2) Increased weather demand. The weighted average of degree days in six representative anthracite marketing cities showed the weather to be 3.7% colder than in 1955, and 1.6% colder than normal.

(3) Increased use of anthracite for the sintering of iron ore. At present, there are no definitive figures of the tonnage used in this field, but it is known that the use of anthracite is increasing at an accelerated pace.

(4) Increased use of anthracite for the manufacture of coke. It is estimated that final figures will show that this tonnage amounted to approximately 390,000 tons in 1956, compared with 365,000 tons in 1955, and 230,000 tons in 1954.

(5) Increased use of anthracite for the pelletizing of taconite ore. As in the case of sintering, there is ample evidence that this use of anthracite is increasing rapidly, but no figures exist concerning the actual tonnage involved.

(6) Increased use of anthracite by electric utilities. This increase of approximately 65,000 tons or 2.0% is not as spectacular as some of the others listed above but, nevertheless, indicates a steadily growing market for some 3,260,000 tons.

With the exception of the weather factor, for which no prediction can be made, it is confidently believed that the factors named above will continue to show increases during 1957.

One of the important milestones of 1956 was the stabilization of the Production Control Plan, through the acceptance by signatories of new allocations that will insure anthracite production being sufficient to meet market demands without excessive overproduction and the resultant waste of a valuable natural resource. This accomplishment exemplified the finest type of cooperation on the part of the Commonwealth of Pennsylvania, the United Mine Workers of America and anthracite operators.

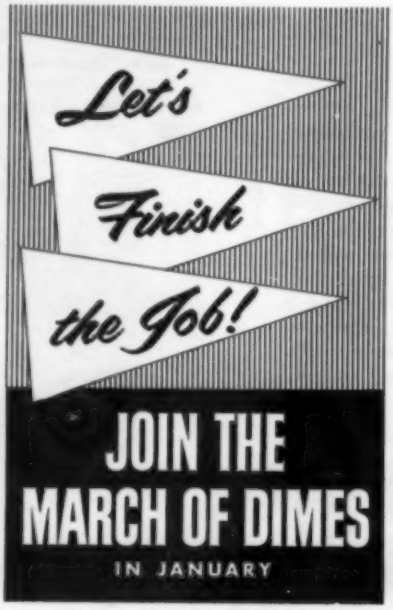
Preparation Facilities

Robena plant, U. S. Steel Corp., Greensboro, Pa.—Contract closed with the Deister Concentrator Co. for one Model 108-B-2 Concenco revolving feed distributor to feed SuperDuty diagonal deck No. 7 coal washing table.

Alpheus plant, U. S. Steel Corp., Gary, W. Va.—Contract closed with the Deister Concentrator Co. for six Model 108-B Concenco revolving feed distributors to feed SuperDuty diagonal deck No. 7 coal washing tables.

Oglebay Norton & Co., David Z. Norton Co., No. 3 mine, Onco, Ohio—Contract closed with Robert Holmes & Bros., Inc., for one Baughman Verti-Vane thermal fine coal dryer unit. Total wet feed 85 tph of ⅜x0 raw coal. Surface moisture of coal to be reduced to approximately 3%

Another step forward for the anthracite industry was in the formation of the Coal Research Board of the Commonwealth of Pennsylvania with an appropriation of $500,000 for research on anthracite and bituminous coal. This program aims at increasing markets for coal, through the development of new and improved uses, by means of basic and applied research. Much of the research work will be conducted by Pennsylvania State University. However, the program will also include a survey of anthracite markets in Western Europe, a project which will be handled by Anthracite Institute.



Research on anthracite also continues at the United States Bureau of mines, Anthracite Experiment Station, Schuylkill Haven, Pa. Here, further progress has been made on the use of anthracite as a substitute for metallurgical coke in blast furnaces and foundry cupolas.

The sale of automatic anthracite heating equipment continued to make gains in 1956, exceeding the previous year's sales by 15%. Accounting, to a large degree, for this satisfactory condition has been the work of the Anthracite Information Bureau, now in its fourth year of promoting anthracite and anthracite heating equipment. This organization sponsored jointly by anthracite producers and retailers, has effectively advanced consumer acceptance of heating with anthracite by both written publicity and traveling displays.

A successful Anthracite Conference was sponsored by Pennsylvania State University on October 18th and 19th. Eight papers of importance to the industry were presented by competent authorities, including papers on the metallurgical use of anthracite in blast furnace, foundry cupola and sintering operations.

A new Wage Agreement, the first since Nov. 1, 1952, became effective on December 1, 1956. The agreement, providing for increases from $1.50 to $2 per day, also increased vacation pay and premium pay for Saturday, Sunday and holiday work. The package increase amounted to approximately $2.15 per day.

As we faced 1956, the statement was made that there was mounting evidence that anthracite's sales curve was definitely flattening off and that the outlook for anthracite in 1956 was brighter than it had been for many years. This opinion was borne out by subsequent events.

As the industry faces 1957, the plus signs definitely outweigh the minus signs and it is our opinion that the upward trend in anthracite affairs, which started in 1956, should continue during 1957.

U. S. Fuel Resin Plant Begins Operating In Utah

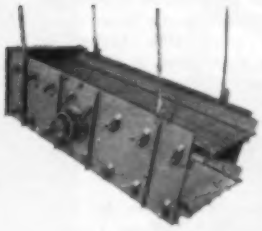
United States Fuel Co.'s new flotation plant for recovering resin compounds released from crushed coal began operating at Hiawatha, Utah, Nov. 30. The plant is the first in the west to be constructed at a coal mine (U. S. Fuel's King mine). Coal from the mine contains a large amount of resin, and although some of it has been collected for years

There's an Allis-Chalmers VIBRATING SCREEN for EVERY Coal Application

For complete information, see your A-C representative or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wis.

Run-of-Mine SCALPING

A heavily constructed, two-bearing inclined screen for scalping ahead of picking tables or crushers. Floor mounted or suspended. Sizes 4 x 10 to 6 x 16 feet, Model XH, *Ripl-Flo* screen.

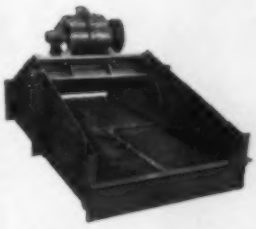


SIZING TO EGG, NUT, STOKER GRADES

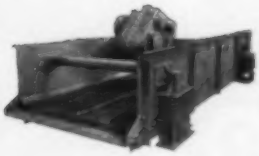
An inclined screen used for wet or dry screening of raw coal ahead of washers . . . for preparing egg, nut, stoker sizes . . . for grading and re-screening crushed coal. Sizes 3 x 6 to 6 x 16 feet, Models S or SH *Ripl-Flo* screen. Send for Bulletin 07B6151D.

DEWATERING — SLUDGE RECOVERY — FILTERING

Operates horizontally for maximum effectiveness in primary and secondary dewatering, desliming and recovery of solids to prevent stream pollution. Sizes 3 x 6 to 6 x 16 feet, *Low-Head* screen. Send for Bulletin 07B6330A.



Allis-Chalmers Builds MORE Coal Industry Screens than any other Manufacturer

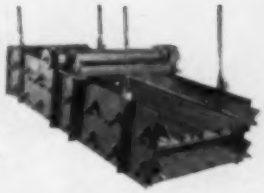


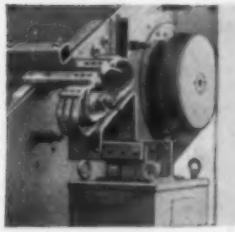
MEDIA RECOVERY

Used for media draining and the washing of coal and refuse, this horizontal screen is available with movable partitions to facilitate handling of both products. Sizes 3 x 6 to 6 x 16 feet, *Low-Head* screen.

AUXILIARY SIZING AND DEWATERING

This modern screen is particularly applicable for sizing coal or middlings following air cleaner, sludge dewatering and dewatering after chloride washer. Sizes 3 x 6 to 4 x 10 feet Model AVS, *Aero-Vibe* screen. Bulletin 07B6099.





SIZING FINE, MOIST COAL — *Thermo-Deck* Heating Unit and *Sta-Kleen* Deck

Low voltage resistance heating of wire cloth eliminates troublesome blinding and increases screen surface life. No downtime to clean screen. Unit can be installed on Allis-Chalmers screens now in use. Send for Bulletin 07B7812.

The *Sta-Kleen* deck, with bouncing balls between cloth and retaining deck, when used with the *Thermo-Deck* unit prevents fine material from baking on screen during interruptions in feed. Send for SN-55.

Thermo-Deck, Sta-Kleen, Ripl-Flo, Low-Head and Aero-Vibe are Allis-Chalmers trademarks.

ALLIS-CHALMERS

A-5012

from fine coals during dewatering, much of the resin has ended up in the refuse dump. Now, coal slurries from the Hiawatha preparation plant are being piped directly to the flotation plant. When a thickener now being built is completed the slurries will be piped from the preparation plant to the thickener, then to the flotation plant. The plan is to assure a more uniform flow to the flotation cells.

In the flotation process slurries enter the plant where they are discharged into an agitation tank. Later they are pumped to a splitter box which distributes the slurry between two units each containing four Fagergren flotation cells. The rough concentrate produced by the cells is relayed to six cells made by Denver Equipment Co. The first four Denver cells produce a cleaner concentrate, the other two the finished resin concentrate. In the next step the finished concentrate, in a gravity flow, moves to an 8-ft-diameter agitation tank. From there it is pumped to an Eimco 10-leaf filter above the flotation circuits and over a railroad car. As the water is removed from the concentrates, they fall into the car. Resin is used in such products as chewing gum, printing ink and furniture finishes.

News Briefs

Construction of a $65 million steam generating plant in the Roslyn-Cle Elum area of central Washington has been found feasible. Owners of coal properties in the area now are working on terms of a contract through which they hope to supply coal for the 311,000-kw facility. The Washington State Power Commission is seeking figures for a firm contract extending 20 to 30 yr.

Charles R. Nailler, president of Christopher Coal Co., Morgantown, W. Va., was named American delegate to a series of coal meetings in Geneva, Switzerland, which began Dec. 10. The meetings were being held under the sponsorship of the coal committee of the Economic Commission for Europe. On its agenda were demand, supply, and consumption of coal in Europe.

Sahara Coal Co., Inc., is reopening Sahara No. 7 mine near Harrisburg, Ill. The operation is being equipped with continuous mining equipment.

Republic Coal Co., one of the three major coal mining firms operating in the Roundup, Wyo., area, is closing down its Klein No. 2 mine after 47 yr of operation. J. T. Fish & Co., Logan, W. Va., has purchased all machinery and equipment. Dismantling operations have been underway for more than a month.

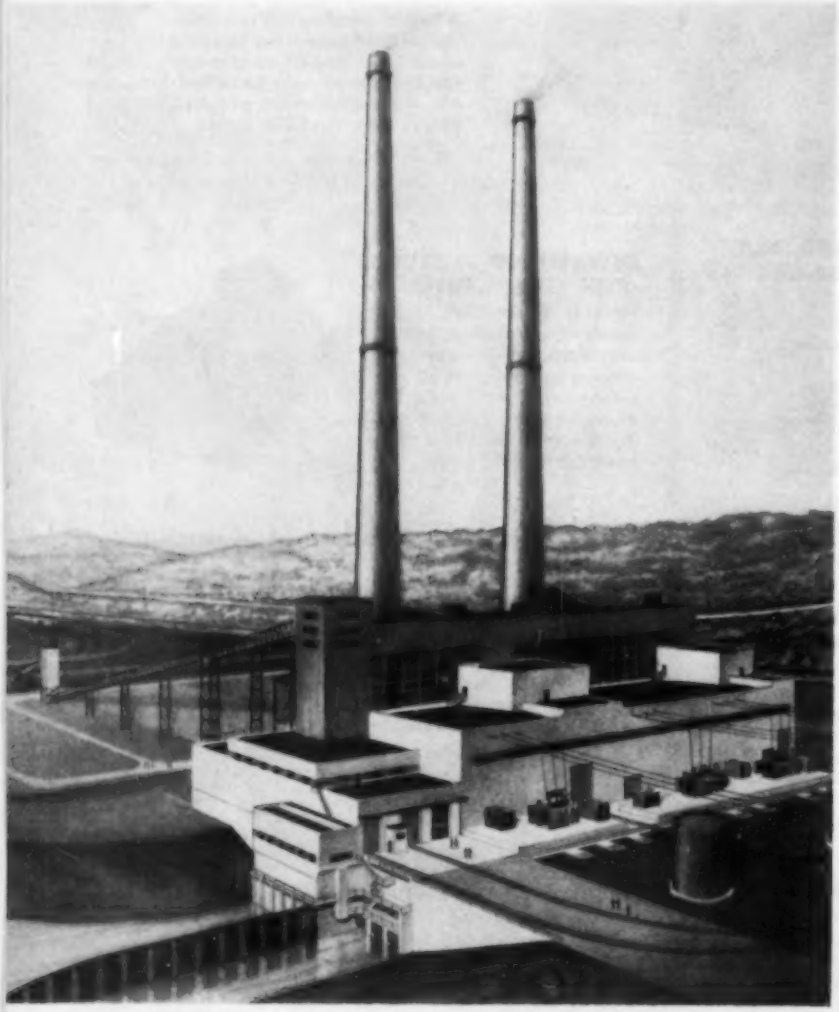
The Anthracite Information Bureau reports that sales of automatic home heating equipment were 20% higher in September than they were in the same month a year ago. September was the 27th consecutive month in which sales of automatic anthracite heaters surpassed the corresponding month of the year before.

Coal underlying 930 acres in West Wheatfield Township, Indiana County, Pa., has been purchased by the Conemaugh Mining Co., subsidiary of North American Coal Corp. The purchase price reportedly was $27,901.

The Newkirk Colliery, 3 mi from Tamaqua, Pa., at one time operated by the Philadelphia & Reading Coal & Iron Co., has reopened after 2½ yr of idleness. Ralph Peters, Schuylkill Haven, Pa., rebuilt the breaker at a cost of $500,000.

Re-opening of the Floresta coal mine at Crested Butte, Colo., believed by some to have as much as 700 million tons of high grade anthracite, is being considered by Giant Resources, Inc. T. R. Gillenwaters of Grand Junction, industrial counsel to Giant Resources, said the company has obtained control of the Floresta and will make surveys this winter to determine market possibilities. Petrochemical processing of the coal on the 5,000-acre property is tentatively planned, he said. Floresta originally was operated by Anthracite, Inc., headed by Dan McIntyre, Hotchkiss, Colo.

Peabody Coal Co. is buying the Poplar Ridge Coal Co., Sturgis, Ky., from the



KAMMER PLANT at Cresap, W. Va., a 675,000-kw facility, will look this way when completed. Illustration above is architect's sketch of the $90 million plant which will be equipped with three 225,000-kw generating units. Two of the units will be owned by Olin Revere Generating Corp. and will serve the major aluminum project of the parent company, Olin Revere Metals Corp., being built at Clarington, Ohio. The third unit will be owned by Ohio Power Co., which will operate all three. Constructon began December 3.

You get your money's worth
when you buy O-B shells and plugs!

You buy more than high-strength anchors when you buy O-B shells and plugs for roof support!

You buy a fast bolting cycle, too, because these O-B units are easy to work with. They go on the bolt fast—no delays due to off-size threads. • They go up the hole fast—no hanging up half-way. • They tighten up fast—no falling out of the hole before tightening, no slipping or spinning in the hole during tightening. • They hold fast—four-way expansion of shell creates a powerful "socket" anchorage that's solidly backed up with heavy metal of the plug.

If you want a high-strength anchor and a fast bolting cycle, too, try these O-B shells and plugs now.

Ohio Brass

MANSFIELD OHIO, U. S. A.

4593-H

Feeder and Trolley Materials • Control Materials • Trolley Shoes
Roof Bolt Shells and Plugs • Rail Bonds • Automatic Couplers

BAIL TYPE
5/8" 22463
3/4" 22378

STANDARD
5/8" 21890
3/4" 21889

News Roundup *(Continued)*

Union Electric Co. The price is undisclosed, but transfer of ownership is expected early this year. Poplar Ridge operates a slope mine near Sturgis, producing 800,000 tons of coal a year. It also holds mineral rights on land containing reserves of about 100 million tons. Almost all production has been used by Union Electric power plants. Reason for the sale, according to Union Electric, was lower cost of coal because of recent river barging. "The company," a spokesman said, "now feels it can obtain coal advantageously by purchase on the open market."

James F. Trotter was elected president of the Northern West Virginia Coal Association at the annual meeting Nov. 27 at Fairmont, W. Va. Other officers are: **George R. Higinbotham,** Consolidation Coal Co. (W. Va.); **W. J. B. Mayo,** Eastern Gas & Fuel Associates; and **Stephen Canonico,** Compass Coal Co., vice presidents; **T. E. Johnson,** secretary-treasurer.

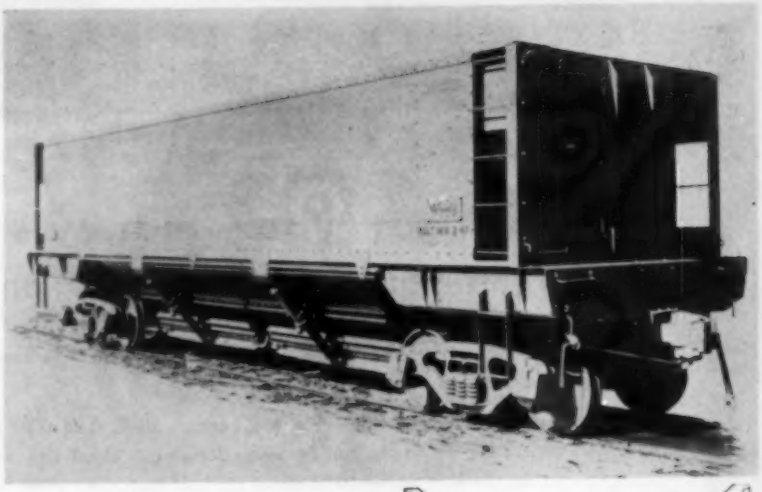
The Pruden Coal & Coke Co., Pruden, Tenn., has been sold for an undisclosed sum. At one time the mine was one of east Tennessee's largest mines, employing about 500 men. It has been closed several months. The new owners, W. Melvin Adams and William F. Conley, are operators of a mining machinery dealership at Whitesburg, Ky., and plan to dismantle the mine's equipment for sale.

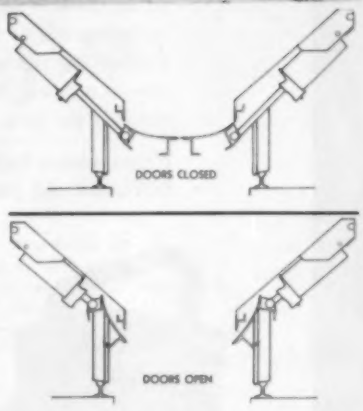
One of the oldest coal mines in the Williamson field, the Leckie Colleries Co. operation at Alflex, Ky., has been worked out. Operations ended Dec. 14. At one time the mine produced 2,250 tpd.

Pennsylvania Representative Augustine B. Kelley plans to introduce a bill to place a quota limitation on residual oil imports. He said the legislation will be designed to restrict oil imports to 10% of domestic demand for the fuel. He warns that when the Suez Canal is reopened tanker capacity will automatically become excessive, and that "unless legislative restrictions are invoked to protect American markets, there is no question that this country will be confronted with a new deluge of alien oil."

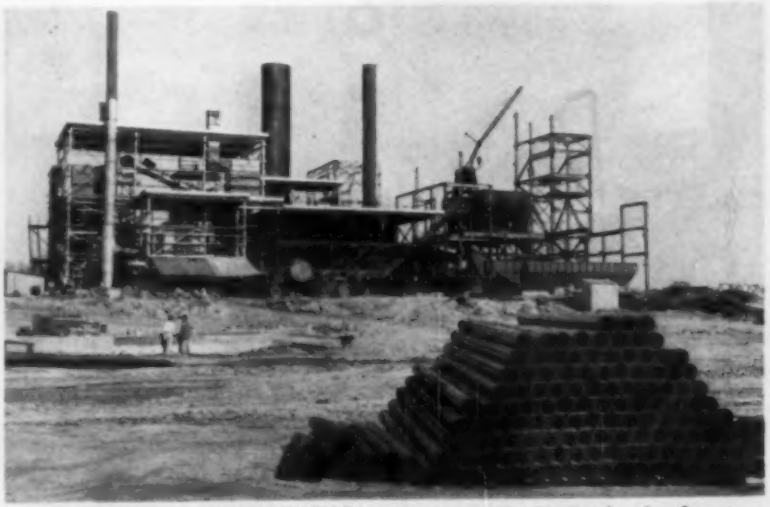
Richard James, James Bros. Coal Co., was relected president of the Ohio Reclamation Association at the group's annual meeting in Columbus, Ohio, Dec. 19. Other officers were James Benedict, Benedict, Inc., vice president; James Robb, secretary-treasurer; Larry Cook, executive vice president; Robert J. Kinnard, executive secretary; and Ed D. Schorr, counsel.

Roy E. Dean, assistant to the president of Ayrshire Colleries Corp., Indianapolis, Ind., was elected president of the Indiana Coal Association at its annual meeting Dec. 14. He succeeds David Ingle, Jr., president of Ingle Coal Corp. W. G. Stockton, district sales





100-TON HOPPER CARS resembling the 70-ton unit above are being constructed for the River Queen Coal Co. The mechanism of the air-operated clam-shell door visible on the side of the car is said to provide instantaneous dumping. Baldwin-Lima-Hamilton Corp is doing the building. Clamshell doors (diagrams), when open, are clear of hopper opening, thus eliminate fouling completely, says Baldwin-Lima-Hamilton. When closed, the doors lock into position automatically, cannot open accidentally.



FREEBURG PREPARATION PLANT being constructed by Peabody Coal Co., Freeburg, Ill., during erection last month. Plant construction will be pushed throughout the winter as part of $38 million expansion program. During the next 4 yr Peabody plans to erect plant, build an 18-mi electric railroad connecting the Freeburg mine site with loading barges on the Mississippi River at E. St. Louis, develop a slope and a strip mine, and construct an office building in St. Louis. [A report last month that the building would be erected in Pittsburgh was false. Ed.] Meanwhile the largest stripping shovel of all, a 70-cu-yd machine, is being manufactured for the Freeburg mine by Marion Power Shovel, Marion, Ohio, manufacturer of the "Mountaineer."

How the Piggyback Conveyor System... keeps continuous mining machines working more hours per shift

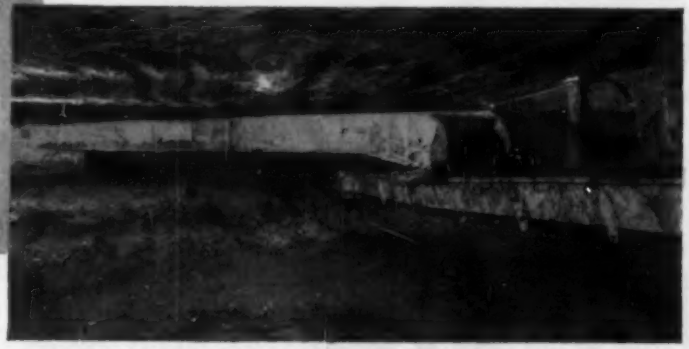
Third Pass
Second Pass
First Pass
Continuous Mining Machine (Any Type)
Approximate length . . 30'
LONG Model "88" Pigloader*
Receives directly from miner . . . serves as a mobile conveyor . . . provides mechanical cleanup and surge capacity . . . trams Piggyback* Conveyor.
Approximate length . . 17'
LONG Piggyback* Conveyor
Transfers coal from loader into room conveyor without interruption or spillage. Pivot action of 180° at each end permits complete freedom of movement.
Approximate length . . 32'
Total Approximate Reach Away From Room Conveyor . . . . 79'
Enough to reach completely through breakthroughs, mine forward from breakthrough to breakthrough, pillar substantial blocks, etc.
LONG Mobile Chain-type Room Conveyor
Equipped with crawler-mounted, self-tramming conveyor drive, moving time is eliminated because one man can move and position this mobile head in less time than it takes to move the miner itself.
Approximate operating lengths. . . . . up to 400'.
Mobile Head
LONG Chain-type Gathering Conveyor

As many leading coal companies already know, the Piggyback Conveyor System is the most practical, most economical method of face transportation for continuous mining. Because it eliminates lost time for car changes, this continuous-flow equipment assures maximum working time at the face—makes it possible for continuous mining machines to operate more hours per shift. Coal is loaded and moved from the face to the outside in a steady, uninterrupted stream *as fast as it's mined.* The result: more tons per man, higher continuous tonnages and less cost per ton.

Whether you're using continuous mining machines or conventional mining units, it will pay you to consider the many advantages provided only by the Piggyback Conveyor System. We'll be glad to supply complete information—without obligation.

Check these advantages of the Piggyback System for continuous mining

Fewer delays • Higher capacity • Lower maintenance • Fewer men in face crew • Fewer nonproductive men • Less down time • Better cleanup • Better operator attention • Greater concentration of mining • Longer economical haulage distances.



Piggyback Conveyor System in operation, servicing continuous mining machine that has delivered single shift tonnages of over 800 tons. Receiving end of Piggyback is attached to Pigloader loading machine and follows it as it moves.

*Trademarks Reg. U.S. Pat. Off.

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FLOOD CITY Bronze Parts are best . . . best fitting . . . best wearing . . . all expertly machined from the best grade of hard, wear-resistant bronze or to your particular specification bronze.

For years Flood City has furnished quality bronze parts at a savings in metal weight and machining costs to a variety of industries.

We welcome your inquiries concerning quotations and delivery on your bronze parts needs. Our reply will be prompt — and there is no obligation.

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JOHNSTOWN, PA.
PHONE: Johnstown 8-1281

News Roundup *(Continued)*

manager, Walter Bledsoe & Co., was elected vice president. Reelected were J. A. Thompson as secretary-treasurer; E. B. Agee, labor commissioner; Julian E. Tobey, Jr., director of engineering; and L. E. Sawyer, manager. The association's directors are Hugh B. Lee, Maumee Colleries Co.; L. B. Girard, Southern Coal Co.; O. L. Scales, Enos Coal Mining Co.; S. F. Sherwood, Sherwood-Templeton Coal Co.; H. P. Smith, Princeton Mining Co.; and David Ingle, Jr.

Electric utility companies and other large consumers of bituminous coal have "a mutual interest in removing roadblocks from the coal industry's progress," according to Tom Pickett, president of the National Coal Association. The obstacles, Mr. Picket says, are high freight rates, excessive imports of residual oil, and natural gas dumping in the utility markets of the United States.

The National Coal Association, from incomplete car loading reports from railroads, estimates bituminous coal production in the United States for the week ended Dec. 22, 1956, was approximately 11,015,000 net tons. Production for the corresponding period in 1955 was 10,439,000 net tons. Production Jan. 1 through Dec. 22, 1956 was approximately 494,670,000 tons. The revised production figure for Jan. 1 through Dec. 24, 1955, was 460,798,000 tons.

Dravo Corp. is building a 1,687-ft loading dock for Peabody Coal Co.'s marine terminal at E. St. Louis, Ill. The dock will accommodate 19 barges at one time, nine loaded, one loading, and nine empty. Completion is expected this year. The dock will be equipped with barge-shifting mechanisms and a pivoted coal-loading conveyor boom to allow for fluctuation of the river level. Dravo will sink 14 sheet-steel pile cells during construction. The dock will rise 48-ft above extreme low water. The two barge-shifter cells will be 20 ft in diameter as will be two of the three cells supporting the coal loader. All other cells will be 16 ft in diameter. Coal will be transported via conveyor belt 288 ft from a hopper on the shore to the loader. The cells in the loading area will be linked by a 4-ft-wide steel-beam walkway covered with steel grating. Provision has been made for extending the dock approximately 400 ft in each direction and adding four additional cells should the need for expansion arise.

Twenty-two employees of Colorado Fuel & Iron mines were recently presented with awards for 30-yr of employment without a lost-time accident. Twenty-three more were recently presented with awards for 20-yr of accident free service.

Utah Power & Light Co. expects to complete a 100-000-kw power generating unit at its Carbon plant, Castle Gate, Utah, the middle of this year. The unit will raise the plant's total capacity to 166,000 kw.

EQUIPMENT APPROVALS

Eight approvals of permissible equipment were issued by the U. S. Bureau of Mines during November.

Mine Safety Appliances Co.—Bantam rock dust distributor; one motor, 5 hp, 440 v, AC. Approval 2-1183A, Nov. 6.

Acme Machinery Co.—Model HSJ-C drill truck; one motor, 20 hp, 440 v AC. Approval 2-1184A, Nov. 6.

Lee-Morse Co.—Model CM42X-3M continuous miner; five motors, three 40 hp and two 10 hp, 250 v, DC. Approval 2-1185A, Nov. 9.

Goodman Mfg Co.—Type 93-S-24-36 rope belt conveyor; one motor, 50 hp, 250 v, DC Approval 2-1186, Nov. 21.

Harris Pump and Supply Co.—Gathering pump; one motor, 7½ hp, 250 v, DC. Approval 2-1187, Nov. 23.

Syntron Co. — Continuous miner; three motors, one 50 hp and two 4 hp, 250 v, DC. Approval 2-1188, Nov. 26.

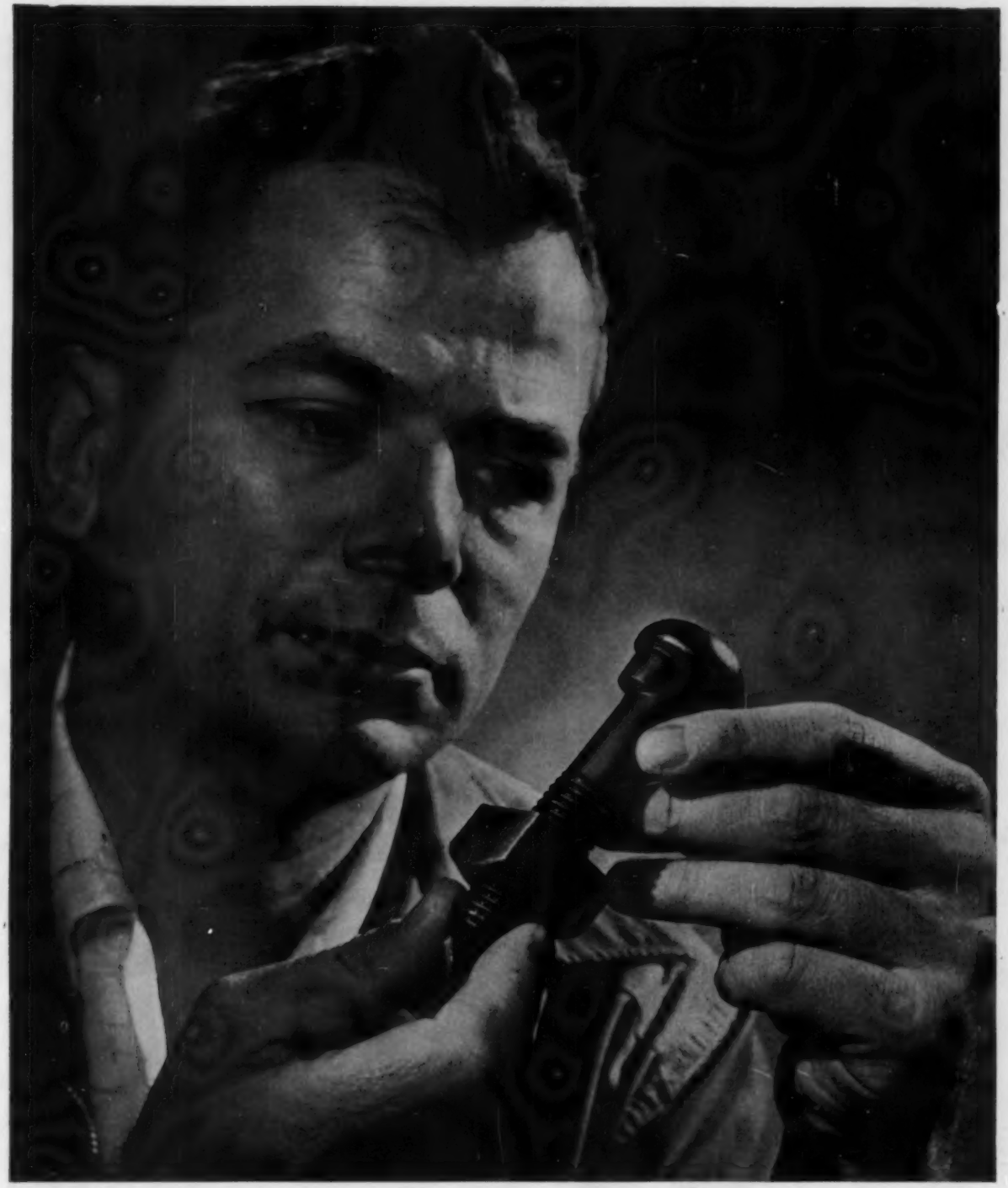
Goodman Mfg. Co.—Type 92-36 rope belt conveyor; five motors, two 25 hp, and two 10 hp and one 3 hp, 550 v, DC. Approval 2-1189A, Nov. 28.

National Mine Service Co.—Model 55C shuttle car. Approval 2-1178A issued to Fairmont Machinery Co. on Oct. 15, 1956, was transferred to National Mine Service Co. on Nov. 21, 1956.

COAL MEN ON THE JOB . . .

WESTMORELAND COAL CO., Hampton No. 3 mine, Madison, W. Va. B. E. Jarrell, mine foreman and Paul Hull section foreman.

John L. Lewis, president of the United Mine Workers and a member of the President's Citizen Advisers on the Mutual Security Program, left for Europe this month. The group will visit 18 lands to prepare a report due the President March 1.



"We've used Bethlehem Track Bolts for years. They've got strong heads and necks, and sharp rolled threads. We can count on them for good performance."

Spikes and machine bolts, too!

BETHLEHEM STEEL

Here's the SCHROEDER 3 way maintenance control system for IMPROVED HYDRAULIC OPERATION

1 *REDUCE the need for repair—*

Schroeder Hydraulic Filter Buggy

Removes troublesome dirt before it can gum up your hydraulic system. Saves oil, cuts pump and system repair costs.

2 *LOCATE trouble at the machine—*

Schroeder Portable Hydraulic Circuit Tester

Does away with time-consuming hunting by quickly pinpointing the trouble spot before removing any component from the machine.

3 *TEST to prove repair—*

Schroeder Hydraulic Test Bench

Removes all guesswork—now you can be sure of the condition of each hydraulic component before it is returned to the machine.

For a smoother flowing hydraulic system use the Schroeder 3 way maintenance control system.

SCHROEDER BROTHERS CORPORATION

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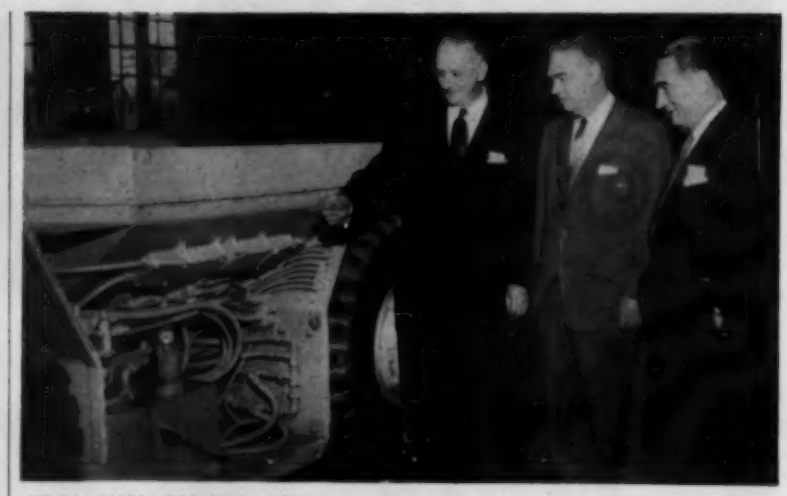
HYDRAULIC, ELECTRIC & PNEUMATIC EQUIPMENT



COAL MEN ON THE JOB

ISLAND CREEK COAL'S president Raymond Salvati (right), and executive vice president J. L. Hamilton are briefed on National Mine Service's new shuttle car by Gordon MacVean (center), president. Car was unveiled before 100 top mining executives during an open house at National Mine's Ashland (Ky.) plant.

COAL MEN ON THE JOB . . .

HANNA COAL CO., Ireland mine: Seated, John Zitko (left), superintendent and Stanley Obejenski, mine foreman. Standing, Eldred Mc Cartney (left), maintenance foreman; Anthony Zitko, foreman; and Harold Durrett, personnel department.

COAL MEN ON THE JOB

MINE OFFICIALS attending Southern Coal Producers' Association luncheon to hear an address by Richard Wilson, chief of Washington, D. C., Bureau, Cowles Publications: W. F. Diamond (left), Holden, W. Va., engineering assistant to vice president, Island Creek Coal Co.; E. M. Bane, Grundy, Va., president, D. J. B. Collieries; Fred K. Prosser, Norfolk, Va., general coal traffic manager, Norfolk & Western Railway; Tom Pickett, Washington, D. C., executive vice president, National Coal Association; I. J. Richardson, Harman, Va., president, Harman Mining Corp; and R. E. Shelton, Holden, W. Va., labor relations administrator, Island Creek Coal Co.

Being interviewed is H. A. Fuggiti, Acting Senior Development Engineer

"Here's where the heavy slugs of power come from"

At the Exide Laboratories—**Reporter:** Just exactly what part of the battery is that, Mr. Fuggiti?

Fuggiti: This is the Exide-Ironclad positive plate. And in any battery, power reserve is governed by positive plate area.

Reporter: Then do you mean that Exide-Ironclad Batteries have *more* positive plate area?

Fuggiti: Exactly. You can see that here. The cylindrical power tubes are arranged in a row. So the semicircular sides give an effective plate area one-third more than the plate size.

Reporter: How does that increase power reserve?

Fuggiti: Because there's a bigger working surface of battery plate exposed to the electrolyte. Power response is faster.

Reporter: What does this mean in battery performance?

Fuggiti: It means the battery can provide power to spare for peak power loads as well as a dependable source for continuous loads.

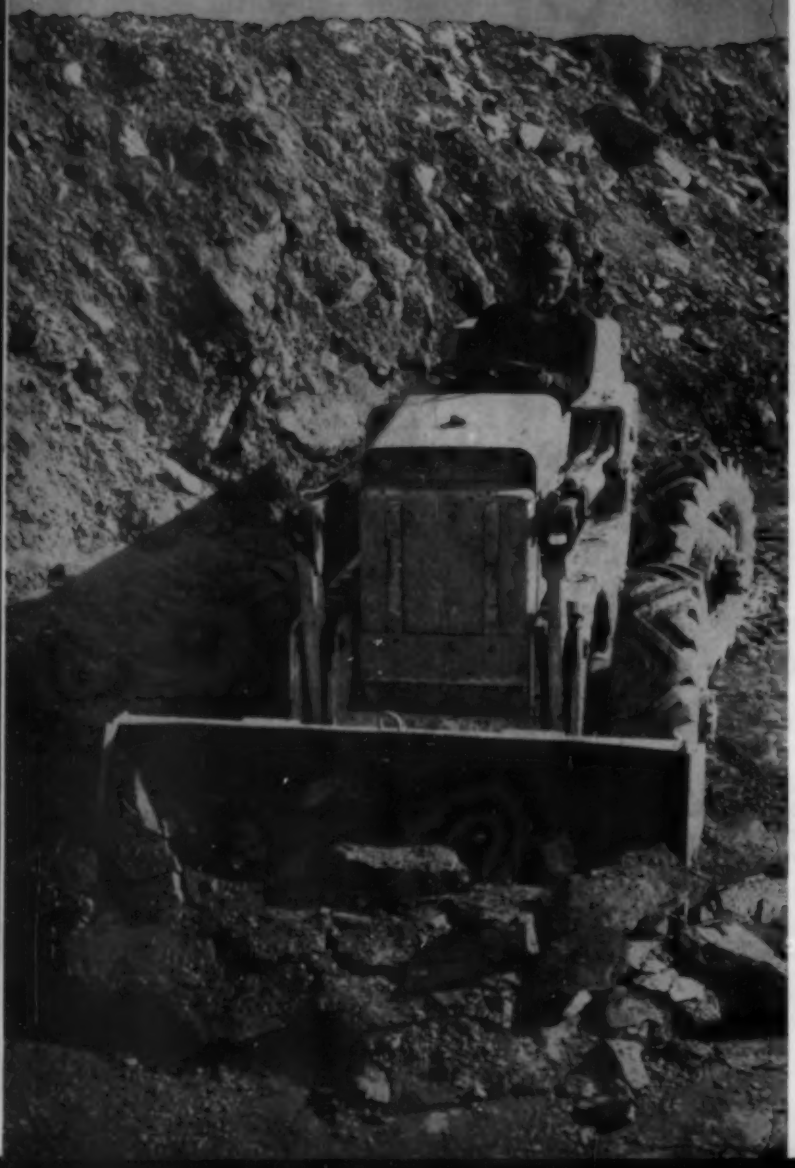
Reporter: Obviously this is an important feature of the Exide-Ironclad Batteries.

Fuggiti: Yes it is, but it's just one of many engineering details that contribute to their long life and high capacity.

Note to battery users: Whenever you order heavy duty batteries or the equipment that requires them, be sure to specify Exide-Ironclad. For detailed bulletin, write Exide Industrial Division, The Electric Storage Battery Co., Philadelphia 2, Pa.

THE ELECTRIC STORAGE BATTERY COMPANY Exide®

Versatile PAYLOADER® Strips · Digs · Loads at Ellis Coal Co.



Ellis Coal Company has been mining in the Bronough, Missouri area since 1930. At first they used a belt conveyor and shoveled the coal on it in order that it could be lifted to trucks waiting on the bank above them. By 1945 they were using crawler tractors with Hough loader attachments. Now, by utilizing rubber-tired, 4-wheel-drive "PAYLOADER" tractor-shovels, they feel they have reached their highest efficiency.

Their Model HH "PAYLOADER" is about the handiest tool in the mine. Major stripping is done by a 5 yd. power shovel, but the "PAYLOADER" cleans off the last several inches on the vein, then digs out the 16″ seam of coal and loads it into trucks.

Keeps Trucks Busy

A single operator with the new Model HH (1¾ yd.) keeps two trucks busy and digs and loads approximately 100 tons of coal each 8-hour day. While waiting for trucks, the "PAYLOADER" operator occasionally drills a few holes with the jack-hammer to prevent over-sized coal fragments from forming. Thinking back to the early days, Fred Ellis, Sr. says, "This new 'PAYLOADER' is doing the work which it used to take 10 men to handle."

Gets Clean Coal

Comparing this new rubber-tired unit with the old Hough-equipped crawler he says, "The greatest improvement since getting the 'PAYLOADER' to load out coal is the clean pit we now enjoy. It was a mess with crawler tractors chewing up the surface, so we had to run a grader in every few hours to level the surface so our trucks could get in."

He further goes on to state, "We now have clean coal, because when it rains the mud does not mix into the coal like it used to. We now find that we do not need a coal breaker. A few pin holes with the jack-hammer drill and the HH pries up under the coal seam with its breakout pressure and, as a result, we get a good bucket load of nicely fragmented coal with little of the effort we used to put out."

• • •

Break-out pads on the bottom of the boom arms contact the ground and act as a fulcrum for powerful pry-out digging action so that full bucket loads are easily dug from the 16 inch seam.

Handles Many Jobs in Any Mine

Strip and underground mine operators both are finding many profitable uses for the three new sizes of 4-wheel drive "PAYLOADER" tractor-shovels — for loading cars and trucks, clean-up, cleaning off tops of coal seams, maintaining haul loads, stockpiling, skidding equipment, carrying tools, switching railroad cars and general drawbar work.

They like the increased production, easier operation and low maintenance provided by new and improved design features — the 40 degree tip-back and powerful pry-out bucket action, no-stop power-shift transmissions, power-transfer differentials, planetary final drives, power-steer, power-braking and hydraulic load-shock absorber.

Your "PAYLOADER" Distributor wants you to prove on your own work that these new "PAYLOADER" models are profit-makers and can out-produce any comparable tractor-shovels. See him soon about a demonstration.

Owners expect more from a "PAYLOADER" and they get more. The knowledge and experience gained in 35 years — building more wheeled tractor-shovels than all others combined — is your assurance of superior design, engineering, performance and service when you buy a "PAYLOADER" from your "PAYLOADER" Distributor.

PAYLOADER®
MANUFACTURED BY
THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.
SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

THE FRANK G. HOUGH CO.
735 Sunnyside Ave., Libertyville, Ill.
Send data on 4-wheel-drive "PAYLOADER®" tractor-shovels as checked.

- ☐ Model HO (2¼-yd. payload, 1¾-yd. struck)
- ☐ Model HH (1¾-yd. payload, 1½-yd. struck)
- ☐ Model HU (1½-yd. payload, 1 yd. struck)

Name _____
Title _____
Company _____
Street _____
City _____
State _____
23

Foreign News

THE EUROPEAN COMMUNITY

The six member nations of the European Coal and Steel Community likely will need 50 million tons of United States coal this year. This is the reasoning: The current rate of import from the United States is already 40 million tons. But this amount will have to be increased because (a) Belgians have lost about 3 million tons of their annual 30 million-ton rate; and (b) the present oil emergency conceived by the Suez conflict may lead to reconversion of some industrial plants from oil to coal. The ECSC High Authority believes that conversions will demand an additional 5 to 6 million tons annually. Thus, another 10 million tons, or a total of 50 million tons from the United States will be needed to bridge the supplies gap.

The upgraded estimate of needed tonnage by the six nations (France, West Germany, Belgium, Italy, Luxembourg, The Netherlands) is an extension of a soaring spiral of imports that began in 1954, a year in which the six purchased 6.2 million metric tons of coal from the United States. By 1955 the figure was 15.9 million. In 1956 they bought 5.9 million tons in the first quarter; 6.8 million in the second; 8.6 in the third; and 10 million (official estimate) in the fourth.

Today, the High Authority estimates that approximately 10 million tons of coal will be imported from the United States in the first quarter of 1957. The estimate does not include supplementary tonnages necessary to cover the fuel-oil shortage. An additional 500,000 tons will come from the United Kingdom (compared with 600,000 tons in the final quarter of 1956). The eastern European countries, Poland and Soviet Russia, are expected to supply 800,000 tons.

One reason for the sharply ascending import spiral is a curtailment of coal from Great Britain in recent years. Another, recently, has been the oil shortage and its resultant strain on coal supplies among the European nations. But the most important reason is growth, a reason that conjures up more than the mere short-term needs caused by a Middle East conflict or Britain's failure as an unlimited supplier of coal. The ECSC realizes this and, as a result, has the question of long-term shortage, rather than short-term, under "rueful study." What this means is that so far no one knows what the answer will be.

The background and the problem:

In 1955, the six-nation community produced 246.4 million tons of coal, but consumed 262 million tons. Four million tons of this came from already low stockpiles. The United States supplied 15.9 million tons, part of which permitted the ECSC to supply outsiders—i.e. Switzerland, Scandinavia, Spain and Portugal. This, then, was the situation in 1955, a year in which the community countries poured 52 million tons of steel and consumed 43.8 million tons.

Within the next 20 yr, i.e. by 1975, the community will need to step up steel consumption from 43.8 to 96 million tons. Allowing for a 13 to 15% increase in steel exports (to 9 million tons), the production program must be for 105 million tons—just over double the 1955 figure. Of course blast furnace and coking capacity must match the pace. Conservative estimates, therefore, are that the need of coking coal will rise from 107 to 158 million tons.

Meanwhile the need for electric power will have risen steeply—from 189 billion to as much as 610 billion kwhr. By that time (1975) approximately 82 billion kwhr will have come within the scope of nuclear power. Hydroelectric sources are expected to be producing 117 billion kwhr against 70 billion today. And, it is estimated that, apart from what is produced from lignite and from low-grade products or by-products (e.g. pitch from Antwerp oil refineries was substituted last year for powdered coal in a Belgian power station at Schelle, near Antwerp), the coal requirements will have to cover 124 billion kwhr, compared with 57 billion kwhr in 1955.

Even allowing for the reduction in coal needs by railroads and the domestic hearth, the total need for coal in the six-nation area will have risen from 262 million tons to 346 million tons. At present production rates the amount will fall short by 100 million tons.

The community's High Authority has pointed out that this shortfall can be met by maintaining the present labor force and boosting labor's productivity by raising the output per man-shift below ground from 1¼ tons to 2 tons.

But keeping labor has become a chronic headache. In Belgium, where the Marcinelle catastrophe (*Coal Age*, Sept., p 142) caused Italian nationals to desert Belgian mines, the underground labor force has fallen from 115,700 to 104,200. Output, of course, has fallen proportionately. In fact, an anti-mine drift in Belgium reflects a general tendency in the community nations to find jobs other than mining coal. As a result the total underground force in the ECSC countries is now 650,000 compared with 686,000 at the end of 1953.

GREAT BRITAIN

The Ministry of Fuel & Power estimates that the extra demand on coal supplies caused by the restriction on oil imports as a result of the Suez crisis will amount to approximately 2 million tons this winter. Although coal output in Britain is not running at a satisfactory level (see story below) the new demand should be met without creating difficulties. The British merely will draw the additional tonnage from stocks, which are high. The ministry says that it has on hand 19,843,000 tons, a figure considerably above what it calls the "danger level" for this time of year. The situation could, however, be worsened by continued haggling over clearing the Suez Canal, severe weather, a heavy fall in production or a new unexpected decrease in consumption.

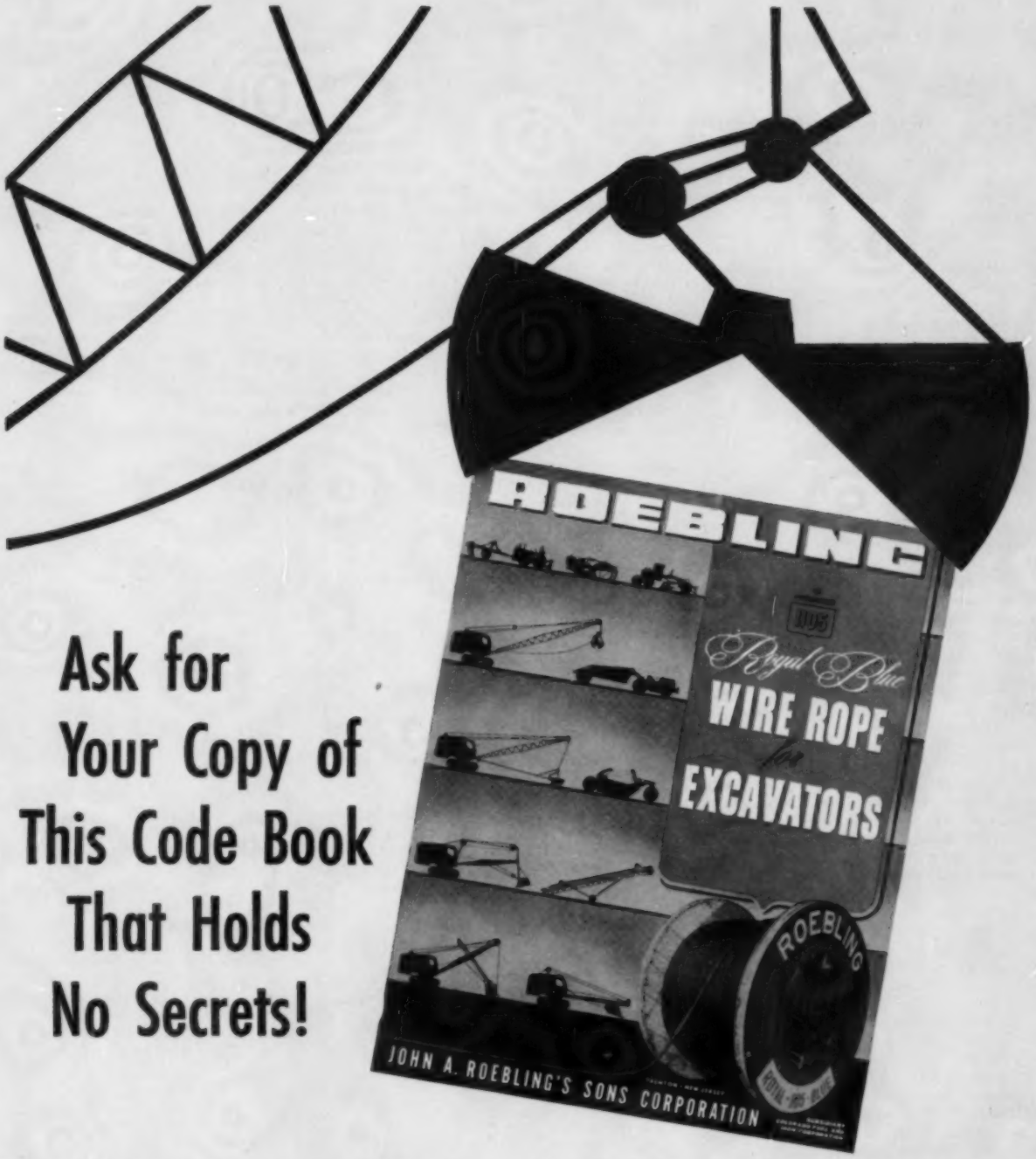
In all, Britons see their present coal situation as an extremely strong one. Although production has failed to increase greatly, industrial consumption, aside from electricity, has not risen much either. Indeed, as one British newspaper put it, the "strong stock position is one of the windfall gains, resulting from a year of industrial stagnation in Britain."

No important drain on coal is expected as a result of large-scale conversions from oil to coal. One of the major reasons for the belief is that conversion would take 6 mo and would be expensive. There is some belief that electric power companies will convert, but the amount of oil now consumed in power generation is comparatively small. The conversions, therefore, if any, would not be large-scale. The main demand for coal to replace oil is expected to appear among miscellaneous small industries where there are distinct possibilities of conversion. However, the expert view thus far is that the demand for coal to replace oil throughout the United Kingdom will probably amount to no more than 1% of present coal consumption. This opinion is based on the assumption that the Suez trouble does not extend beyond 6 mo. If the oil shortage begins to look as though it will last longer than that, then the scope for industrial conversion and the potential demand for additional coal would increase considerably. In short, time will decide whether demand for coal will increase greatly.

One reaction to the oil shortage in Britain has been the National Coal Board's plan to accelerate its underground gasification program. The project for igniting hard-to-get-at coal seams to obtain gas will be augmented and operations will be increased rapidly. To date a pilot scheme is expected to be in operation by the end of 1958. Gas will be delivered to a 5-mw plant on the borders of Yorkshire and Derbyshire. The seam that will be gasified has a high ash content and is of a type that is plentiful in Britain. If the pilot plant is successful a full scale 60,000-kw station using 1,000 tpd is expected to be built.

Meanwhile the coal board is seeking ways to halt the decline in the production of deep mines. The board and trade unions have directed divisional committees to investigate on the local level. Each week since the end of summer deep mine output has lagged behind output of the same period 1 yr earlier. The reason appears plain: an epidemic of small strikes and stoppages. In Yorkshire there were 250,000 tons lost.

Thus, output of deep mines for the first 48 wk of 1956 was 194,078,700 tons, compared to 194,224,000 tons in the corresponding period of 1955. Stripping, however, rising from a production figure of 10,726,900 to 11,265,400 tons, has moved total production (205,344,100 tons) above the 1955 figure (204,950,000).



Ask for Your Copy of This Code Book That Holds No Secrets!

If you operate excavating equipment, Roebling's new booklet, "Wire Rope for Excavators," is a must. It's chock-full of sound recommendations on where to use Royal Blue Wire Rope—the rope that's built to be stronger than the finest grade previously available.

The easy-to-follow coding system assures that you get the right rope every time. It covers hoist ropes, dragline ropes, ropes for shovels, skimmers, scraper wagons, trench hoes, clamshell cranes, slacklines, derricks, drag scrapers and bulldozers. The recommendations are for the rugged conditions you meet every day.

You'll also find supplementary data on wire rope constructions, diameters, weights and breaking strengths.

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POLAND

This country's entire economy is threatened by the growing coal shortage. Wladyslaw Gomulka, secretary-general of the Polish United Workers Party, is expected to close down a number of coal-consuming factories to conserve the scarce supply. In a speech to miners he indicated that there were three basic causes for the current drop in coal output. The first, a short term cause, is the disorganization of the mines resulting from the recent political crisis. Miners have tended to halt work and devote themselves to political arguments. The second, a medium-term cause, is the severe fluctuation of the labor force because of poor working conditions, lowered manhour productivity, and the run-down condition of mines because of little maintenance. The third basic cause, a long-term one, is exhaustion of many old mines, the deteriorating quality of the coal and inaccessibility of the remaining seams.

Production wise, this is the background: Total coal production in 1949 was 74.5 million metric tons, of which industry used 24 million, power plants 4.4 million, railroads 6.4 million, domestic consumers 7.5 million, government allocations to domestic consumers 5 million, exports 26.8 million. Total domestic consumption was 47.4 million tons, or 64% of production. In 1955, the last year of Poland's 6-yr plan, total production was 94.5 million tons, or 27% more than 1949 production. But, internal consumption over 1949 increased this way: industry 60%, railroads 44% power plants 120%, sales to domestic consumers 28%, government allocations to domestic consumers, no change. Exports totaled 24.2 million tons. Thus 74% of production was consumed internally. Despite the rise in overall output exports dropped in the 6-yr period by 2.6 million tons.

In 1949 coal and coke represented 54.5% of value of all Polish exports. In 1955 coal and coke represented 46.6% of the total value of exports. The plan for 1956 had called for exports of 24.5 million tons, but Mr. Gomulka says rising internal consumption and falling production made 19.5 million tons the absolute maximum Poland could hope to have exported by the end of 1956. In the first 11 mo of 1956 Poland had mined 88 million tons, but another 8 million tons was needed to fulfill the year's 96-million ton target. Meanwhile, in Warsaw the Coal Mining Minister, F. Vaniolka, has set a production target of 125 million tons annually by 1965.

AUSTRIA

Austria imported more than 2 million tons of United States coal during 1956 and expects to increase imports this year at the same rate that east and west European coal suppliers reduce their deliveries. Her own rate of industrial expan-

(Continued on p 142)

LETTERS

Couillette, Belgium

EDITOR,
Coal Age

Dear Sir,

The Marcinelle colliery disaster, which recently occurred in Belgium, is the greatest in the history of the country and has placed the whole nation in mourning.

With the exception of the Communists, the entire country was drawn together in its bond of sorrow. Workers, engineers, and managers did everything within their power to save that which could still be saved and sought to find, in a constructive spirit, all the available means of preventing the possibility of similar accidents in the future. Indeed there was a movement of solidarity which, on a smaller scale, resembled that which today is evoked by the tragedy of Hungary.

The September issue of *Coal Age* [p 142 *Ed*] published a note on the Marcinelle disaster. The UPIC (L'Union Professionnelle des Ingenieurs des Charbonnages) feels obliged to inform you that this note includes several misstatements which, together with its tendentious judgments, is likely to discredit the whole of the Belgian mining industry in general and the mining engineers in particular. We should like to assure you that your own good faith, and that of the journalist, is not in doubt but that, nevertheless, it is our deep impression that the note in question is likely to create a false impression in the intellectual circles to which *Coal Age* is addressed, and that in requesting you to correct the errors which unfortunately appear therein, we are only appealing to your sense of justice.

We do not intend to give our opinion on the technical reasons which caused the accident, nor to say if the security measures in the particular case of this special disaster were observed. At the moment, three enquiry commissions, including an international one, are engaged in investigating.

We know, beyond a shadow of doubt, that from the beginning of the disaster all possible measures were taken to aid the victims. In Marcinelle itself there is a rescue center, which is always in a state of alert, and which went into action immediately. Other Belgian and foreign centers were alerted in good time. The fire service also went into action from the very beginning.

It is true that certain appeals were broadcast over the radio, but these emanated, not from the responsible authorities but from well-meaning individuals who acted as they did without any orders.

As to the many offers of aid which were received, it is necessary to state that these could only be accepted according to the need of the moment. No sooner had the fire broken out that—and this is unparallelled all over the world—it spread with the swiftness of lightning in the two shafts. Access to the bottom of the pit was immediately blocked and mass intervention then became impossible and external aid temporarily useless. All the engineers, foreign or Belgian, who were present at Marcinelle agree with this.

As stated by you, a German engineer volunteered to make a perilous reconnaissance descent at the end of a rope below 3,000 ft. This plan, however, had to be abandoned owing to the impossibility of putting it into action. Had there been any chance of it succeeding, there is no doubt that Belgian volunteers would have offered to undertake the descent from the very beginning of the disaster.

The assertion that it is the habit in Belgian collieries to immobilize safety fuse-boxes has absolutely no foundation whatsoever, anymore than the statement dealing with negligence regarding roof-support and shoring up.

As to "safety" notices, these are usually to be found in French, Flemish and Italian. This measure, however, is not enforced by any regulation and there may be exceptions to the general rule.

You raise the point as to whether Belgian mines do not take great risks with human life. In agreement with the Belgian government, an Italo-Belgian Commission was established in 1954 to decide: (a) whether the safety regulations for mines in force in Belgium guarantee sufficient protection for the miners; (b) whether the regulations in force are strictly observed; (c) whether the infringement of the laws and regulations are punishable in accordance with the gravity of the offence.

The answer to all three points was in the affirmative.

Moreover, despite the fact that we have to deal with narrow, faulty and difficult seams, despite exploitation at great depth and the resulting earth pressure, despite the existence of huge quantities of methane, despite the instability in our personnel and the employment of many foreign workers who do not understand our language, statistics demonstrate that we do not have more accidents than elsewhere.

The number of fatal accidents in our mines dropped from 66 in 1953 to 48 in 1954 and to 32 in 1955. Belgian mines are therefore no more dangerous than others.

Moreover, the Italo-Belgian Commission, although it only knew the statistics up to 1953, concludes: "The number of mine accidents in Belgium cannot justify the severe criticism on the manner in which the mining industry is exploited, supervised and controlled."

It would seem that our difficulties and our efforts are little known and still less appreciated in America. Mr. Neil Robinson, author of a report on Belgian coal mining after managing one for a year, has recognized that the results in Belgium are worthy of praise. In the May, 1951 issue of *The West Virginia Engineer* he writes: "It should be emphasized that the Belgian problems are tremendously greater and more complicated than in any other mines in the world."

To return to Marcinelle, the truth is

Rear-Dump hauls heaped loads over deeply-rutted mine floor. Rig keeps going steadily through soft footing, takes minutes off each cycle...hauls up to 42 loads in one day!

Helps gloss pages of nation's top magazines

Low rear-entry and wide bowl provide easy target for shovel operator... make for fast swingout of shovel dipper, let operator heap maximum yardage with minimum spillage.

At touch of electric switch, body lifts, swings below and behind rear wheels...prevents material from piling under unit.

Thiele Kaolin Co., Sandersville, Georgia, supplies kaolin to coat paper for *Life* magazine and for quality papers from mills across the country. To get this kaolin, Thiele is working a 30-acre pit, using 2 draglines, a ¾-yd. shovel, and an 11-ton D Tournapull Rear-Dump.

At one end of the mine, a dragline with 6-cu. yd. bucket strips overburden. As the kaolin is exposed, the dragline digs this material and dumps it in stockpiles according to grade.

It is necessary that the various grades of kaolin be carefully blended to produce the final quality specified by the ultimate users. To accomplish this "mixing", a ¾-yard shovel loads "lean" kaolin into the D Tournapull Rear-Dump, which hauls it to other "rich" stockpiles near a mixing hopper. Here a second dragline mixes and loads the kaolin into the hopper. The material is mixed with water and forced by pressure-pump through a pipeline to the mill.

Averages 42 loads a day

At the time these photos were taken, the ¾-yard shovel was loading Tournapull Rear-Dump with approximately 7½ yards of kaolin in about 2¾ minutes. The average 500′ haul from the "lean" pile to dumping area was deeply-rutted, wet, and slippery. Although some of the ruts were 2′ deep, rig's haul-time averaged only 1½ min. It took Rear-Dump less than a minute to turn, back into position, and dump. Rig completed average 1000′ cycle in 6 min. 20 sec.... hauled 38 heaping loads in 6½ hours. Rig averaged 42 loads per 8-hour day, depending on mill requirements.

Replaced 2 trucks with 1 Rear-Dump

Originally, Thiele used 2 trucks, but replaced them with the one D Tournapull Rear-Dump. According to Supt. Owen E. Robbins, "One-man operation suits me! We like Rear-Dump's ability to get through mud where trucks couldn't go."

Power-transfer differential and power-steer, speed hauling

With Tournapull prime-mover's exclusive power-transfer differential, which automatically applies power to wheel on firmest footing, the heavily-rutted and slippery underfooting is no problem. Positive power-steer adds to Rear-Dump's tractive power, because it lets operator pivot prime-mover from side-to-side to "walk" machine out of tough going.

Increase production... cut costs

According to Mr. Robbins, a saving of 75% in fuel, and 50% in lubricating oil was effected when 2 trucks were replaced by one D Tournapull Rear-Dump. Changing from trucks to Tournapulls, Thiele Kaolin reduced operating costs and increased production. Rear-Dump provides uninterrupted service in these mining operations.

Looking for a way to save money?

If you have a hauling problem of any kind, investigate Tournapull Rear-Dumps... available in three sizes: 11, 22, and 35-ton capacities. Send for detailed information.

Tournapull—Trademark Reg. U.S.Pat. Off. DR-1062-M-b

LeTourneau-WESTINGHOUSE Company, PEORIA, ILLINOIS

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WHERE QUALITY IS A HABIT

Letters *(Continued)*

that the mining profession is a dangerous one. It is unfortunately impossible to doubt that there will be other colliery accidents just as there will be other air and road accidents. Nevertheless we hope that, in a great movement of mutual aid, engineers the world over will combine in their efforts to avoid future disasters like Marcinelle, which has cost Belgium 263 victims; Courriere with 1,099 victims in France; Westfield with 259 victims in the United States; Gesford in England with 264 victims; or that of Neukirchen in Germany which claimed more than 300 lives.

We should be grateful if, as a proof of your impartiality and in fairness to the Begian mining industry, you will be good enough to publish this additional information.

Yours very truly,

On behalf of "Union Professionnelle des Ingenieurs des Charbonnages"

A. Gohmann,
Secretary

R. Dessard,
Chairman

AUSTRIA *(Continued)*

sion will also dictate increases in coal imports. But the biggest problem is coal needs for the production of coke. Annual requirements are expected to approach the 70 million-metric-ton mark during 1960. As a result Austria will seek more and more coal from the United States as the European coal deficit continues to rise.

Austria's coal shortage has resulted from multiple causes, among them government pressures. In 1954 the country's brown and hard coal yield was doubled; but 1956 brought no more tha a 3% higher yield over 1955. Production limits are not, however, due to exhausted deposits, but to exhausting economics. Retail prices in Austria for domestic coal have not been raised in 5½ yr. All increased material and labor costs have been shouldered by the government. The result has been a constantly reduced gap of profit, which has made it impossible to keep up with modernization. Imported coal retails from 50% to 100% more than domestic. But the low price of domestic, which is called the "political" price, is kept on mainly as a pressure instrument directed against the smaller, privately operated coal mines. In fact, the liquidation of these smaller enterprises has risen sharply since January, 1956. But late in 1956, perhaps realizing the overwhelming impact of its unrealistic domestic coal prices, Austria's trade and finance ministers have agreed to raise the price this year.

INDIA

This country will soon set up a National Coal Development Corp. to plan development of her mines, according to the Indian Minister for Heavy Industries, Manubhai Shah. The corporation will attempt to step up coal production from the present 38 million tons a year to 65 million. To meet the mechanical needs of a revitalized coal industry a major machine tool factory would be set up in Hyderabad.

JAPAN

Japanese industry will be forced to depend increasingly on heavy oil for power as coal output reaches a ceiling, the International Trade and Industry Ministry reports. In the next 20 yr the demand for coal will jump to 110 million tons by 1976, the Ministry reports. But coal output will not increase beyond the 65 million ton mark and industry will be required to shift to heavy oil. Japan's coal output, now is 49 million tons.

CANADA

British Columbia and Alberta coal miners have won a pay boost of $1.20 a day. Approximately 4,500 miners, members of the United Mine Workers of America, District 18, received the boost. The new contract between the miners and the Western Canada Coal Operators Association was signed in Calgary, Alberta after a strike of 1,000 miners in east central Alberta threatened to spread. After an earlier rejection of an arbitration award which would have given the miners a 50-cents a day increase. Wages before the increase were $13.50 a day. The new contract runs from July 3, 1956 to July 2, 1958 and provides that from July 30, 1956 to November 30, 1956, the miner will receive 50 cents for each 8-hr day. From December 1, 1956 to July 2, 1958, an additional boost of 70 cents a shift will be in force.

WEST GERMANY

West Germany coal production amounted to 11,502,600 tons in November compared with 11,616,800 in September.

FRANCE

Coal consumption in France will reach 80 million metric tons in 1956, compared to 70 million in 1955. Imports are expected to exceed 18 million tons, of which 6½ million will come from Germany, 6.2 million from the United States. In addition another 1½ million tons of United States coal will have to be bought to offset the oil shortage caused by the Suez Canal dispute. This last will be delivered as soon as cargo space is available.

SOUTHERN RHODESIA

The Wankie Colliery in Southern Rhodesia, which supplies nearly all the coal used in the Federation of Rhodesia and Nyasaland, has enough coal within its mining concession and areas where it has mining options to produce 5 million tons a year for the next 95 yr. The company intends to exploit much of its reserves by stripping. During recent boring operations, the company says, it was discovered that 100 million tons of high-grade coal lay at variable depths up to 150 ft. As a result a number of Wankie engineers have spent some time studying the latest stripping techniques practised in the United States. Meanwhile, however, stripping will be delayed because of Rhodesia's old problem—its Rhodesian Railroad system, which is incapable of carrying extremely large quantities of coal from Wankie to the main population centers of the Rhodesian Federation. Thus, coal production at Wankie is restricted now by the limited carrying capacity of its railroad system.

HUNGARY

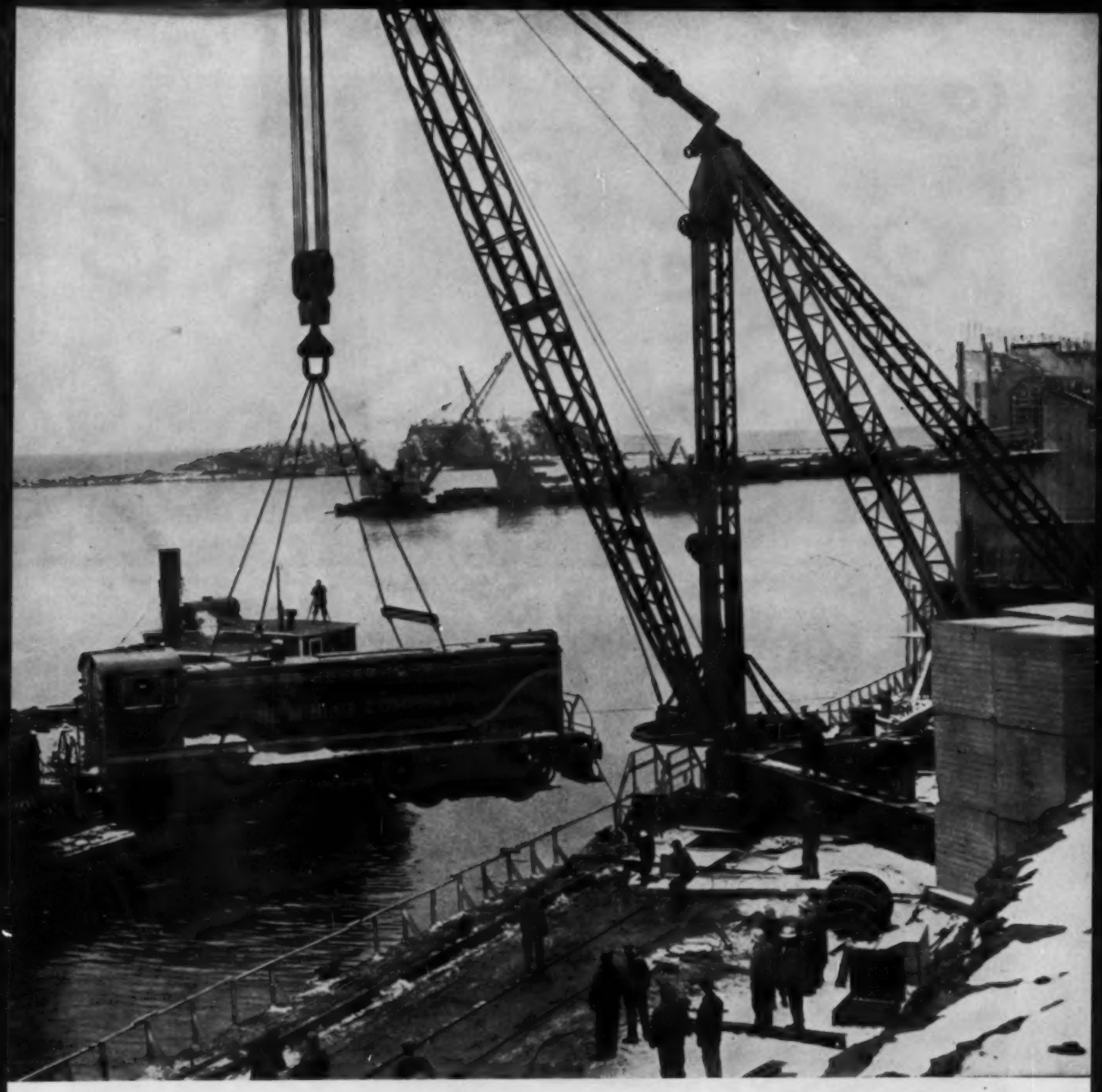
The Hungarian puppet government will attempt to head off further "anarchy and inflation" by the "timely import of coal and foodstuffs" into Hungary, according to Antal Apro, Hungarian Industry Minister. The daily output of coal at the end of November amounted to 10,000 and 12,000 metric tons against consumption needs of 70,000 to 80,000 tons. By December and the New Year coal production was unestimated, but observers were certain it had fallen far below the November figures. This was based on the fact that during the last month of 1956 coal miners remained the most adamant in refusing to comply with the Janos Kadar government orders and pleas to return to work. Mines were flooded, work managers were evicted by the men. Two days before Christmas they were still demanding the return of former Premier Imre Nagy before they would return to work. Out of 85,000 men only 13,000 were reported working in December.

GREAT BRITAIN

More coal was produced in Britain in the second week of December than in any other week since December, 1937. Deep-mined output was 4.79 million long tons, about 40,000 tons more than the corresponding week last year. Stripping output was 275,000 tons, 80,000 tons higher than 12 mo ago. The previous output record since nationalization was in December, 1953, when almost exactly 5 million tons were produced.

Total output for the first 50 weeks of the year now stands at 215.25 million tons, compared with 214.73 million in the same period last year. But deep-mined output, at 203.44 million, still lags behind last year's rate by 133,000 tons. Coal imports in the week ended Dec. 8 amounted to just under 49,000 tons, an increase of 7,000 tons on the previous week. In the same week last year 182,000 tons were imported.

The National Coal Board hopes to reach an annual output of 240 million tons by 1960, compared with 215 million tons today.



Wire Rope at Work—For a locomotive, this is a rather unusual experience—a quick trip by air from barge to dock, over gray, chill waters. The unit pictured is one of a trio shipped from Duluth to Taconite Harbor, Minnesota, for use at Erie Mining Company's vast taconite project. In handling the load, that big, powerful derrick hoisted the locomotive as easily and gently as if it were a toy.

The derrick, a stiffleg, has a capacity of 183 tons at a 40-ft radius. For the load shown here, the rigging was 21 parts to the boom line, 18 parts to the hoist line. Bethlehem Purple Strand was used throughout—a grade of wire rope so strong and tough that it's always a logical choice for jobs like this.

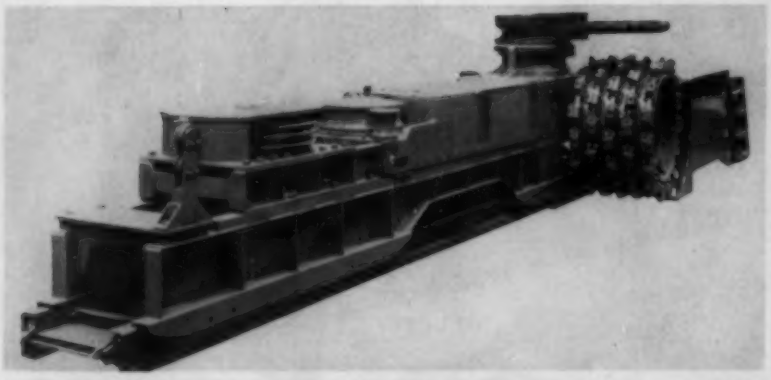
Bethlehem Steel Company, Bethlehem, Pa. On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

Mill depots and distributors from coast to coast stock Bethlehem rope for the following industries and numerous others:

MINING • QUARRYING • CONSTRUCTION • EXCAVATING • PETROLEUM • LOGGING • MANUFACTURING

WESTFALIA ANBAUHOBEL, or longwall plow, one of the newer German mechanization units. Maximum capacity with a 1,000-ft conveyor is 330 tph. The Anbauhobel operates at 75 fpm with a 110-hp drive, electric or pneumatic.

Longwalling in Germany



A PRODUCTION INCREASE of 3.3 million tons was recorded by the West German coal-mining industry for the first 10 mo of 1956 compared with the same period in 1955. Despite this, productivity is less than before World War II, since war damage is yet to be completely cleared and deeper and less favorable deposits are being mined. Further, decartelization reportedly has reduced efficiency in some areas. Two years ago, realizing more mechanization was needed, operators installed machinery where they could. Some of the results: an average saving of 45¢ a metric ton through the use of planers, 11¢ where cutters are used. With this encouragement and the added spur of increasing wages the research institute of the coal-mining industry is pushing ahead with intensive plans which may mechanize the entire industry.

ROLLER CUTTER features German Eickoff cutter-loader, available with or without overcutting bar. The roller throws the coal on to an inclined plate feeding to a chain-type face conveyor.

Jeffrey belt conveyors carry coal to a Jeffrey Baum jig at a large West Virginia coal preparation plant.

A Jeffrey apron feeder transfers coal from a hopper to a belt conveyor at Western strip mine.

This Jeffrey scraper conveyor transports sludge from the jig at another West Virginia coal company.

For every coal handling job there's a

JEFFREY CONVEYOR or FEEDER

Efficient handling of coal in the preparation plant enables you to utilize washing facilities to obtain maximum production. Jeffrey has a complete range of feeders and conveyors to answer any handling problem at your coal preparation plant.

If any or all of your handling operations need modernization, let Jeffrey engineers consider your problem. For information on coal handling equipment to give you most efficient operation, get in touch with The Jeffrey Manufacturing Company, Columbus 16, Ohio.

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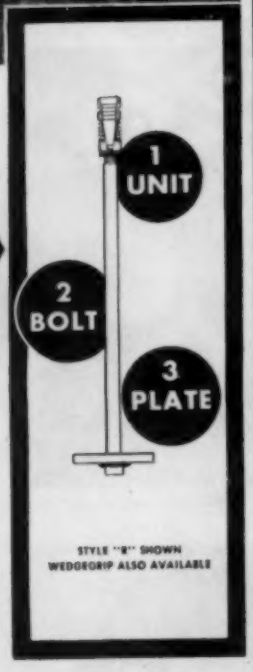
CONVEYING • PROCESSING • MINING EQUIPMENT
TRANSMISSION MACHINERY • CONTRACT MANUFACTURING

Large Indiana Mine
SAVES TIME..
SAVES MONEY
with assembled bolts



The efficient operation shown above is among America's largest. Their bolting problems were solved when they purchased completely assembled West Virginia units with a small plate to reduce handling problems. Here is another satisfied West Virginia user, with a remarkable safety record, that finds the completely assembled bolt, plate and unit a money saving way to bolt.

America's Best Mines BUY
WEST VIRGINIA BOLTS with confidence
Write or contact
West Virginia Works, Connors Steel Division, Huntington, West Virginia

50 YEARS OF SERVICE

WEST VIRGINIA WORKS
CONNORS STEEL DIVISION
HKP H. K. PORTER COMPANY, INC.

Obituaries

Vernon Frank Parry, 57, authority on coal utilization and chief of the Coal Technology Branch of the U. S. Bureau of Mines, died in a Denver hospital Dec. 17. Mr. Parry developed a process for drying and carbonizing coal and lignite in use by the Texas Power & Light Co. and the Aluminum Co. of America. He received the 1955 Dept. of Interior gold medal for distinguished service. He had been to India recently to consult on economical utilization of coal deposits.

Mr. Parry was born in Ogden, Utah, and was graduated from the University of Utah in 1922. He received a master of science degree from the Carnegie Institute of Technology in 1923. From 1923 to 1931 he was supervisor of research for the Combustion Utilities Corp. of New York. In 1931 he joined the University of West Virginia faculty as professor of gas and fuel engineering. Six years later, in 1937, he moved to Denver as chief of the Coal Technology Branch of the Bureau of Mines.

G. Albert Stewart, 66, secretary of the Central Open Pit Mining Association, died December 3 of a heart attack in Clearfield Hospital, Pa. Mr. Stewart, prominent in Pennsylvania politics, had been Secretary of Forests and Waters during the administration of Governor James.

Joseph B. Kelly, Kingston, Pa., for 25 yr an engineer of the Hudson Coal Co., Larksville, died December 3 in Nesbitt Memorial Hospital, Wilkes-Barre, Pa.

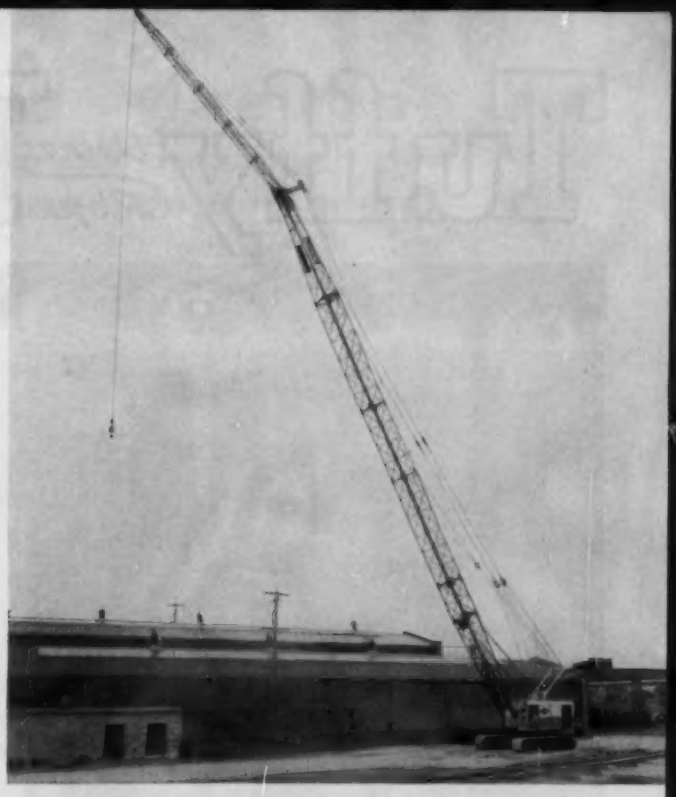
Richard M. Hess, vice president of operations of the Morrisdale Coal Mining Co., Pa., until his retirement in July, 1956, died in Philipsburg November 25. He was 63. For a number of years Mr. Hess had been a member of the board of directors of The Central Pennsylvania Coal Producers Assn.

Association Activities

C. R. Griffith was elected president of the Southern Appalachian Coal Operators' Association during the organization's annual meeting Nov. 23 in Knoxville, Tenn. **W. S. Webster** was elected first vice president, **Fred Loving Jr.,** alternate. **J. O. Archer** was elected second vice president and **H. S. Homan** executive secretary and treasurer. In other appointments by the membership these directors were chosen: **R. H. Hughes,** Clinchfield Coal Corp; **Ray S. Walker,** Laddie Coal & Mining Co; **L. M. Rayburn,** Blue Diamond Coal Co; **James Cheely,** Regal Mining Co; **C. R. Griffith,** Southern Coal & Coke Co; **W. C. Hutcheson,** Wind Rock Coal & Coke Co. (**Warren Haydon,** alternate); **E. F. Wright,** Clinchfield Coal Corp; **Fred Loving Jr.,** New Jellico Coal Co; **Irwin Sampson,** Mahan-Ellison Coal Corp; **C. J. Potter,** Rochester & Pittsburgh Coal Co; **J. O. Archer,** Blue Diamond Coal Co; **W. T. Ray,** Meadow Creek Coal Co.

LIMA

Announcing
TWO NEW LIMAS



TYPE 1250

3 CU. YD. HEAVY-DUTY SHOVEL

HIGH-CAPACITY DRAGLINE

85 TON CRANE AT 13′ RADIUS

Here are two powerful additions to the LIMA line of power shovels, cranes, draglines and pullshovels. The Types 1250 and the 1250-SC are the carefully engineered answers to the popular demand for a high capacity shovel and a crane that will hoist concrete and steel to the top of a 24-story building.

As a standard shovel, the 1250 is equipped with a 28-foot boom, 22-foot handle and three cubic yard dipper; as a high lift shovel, with a 45-foot boom, 32-foot handle and 2½ cubic yard dipper.

The 1250-SC is designed for sky-scraping duty, a rugged machine that swings a 200-foot boom and 50-foot jib with pin point precision.

These air operated rigs are in the big-time producer class yet their design permits knock down for haulage into units of less than 60,000 pounds. Side frames and counterweight segments are removable and the gantry can be folded to a height of 12-feet, 7¼ inches for job to job transportation.

Two truck bases are available—standard and widespread as well as two lengths of crawler assemblies (standard and long). The bases are one-piece carbon steel castings, bored and bushed for through axles.

The 1250 and 1250-SC are available with diesel or electric power and with or without torque converter drive.

TYPE 1250-SC

100 TON CAPACITY ON 60′ BOOM AT 13′ RADIUS

18 TON CAPACITY ON 200′ BOOM AT 50′ RADIUS

Get complete details on this profit-making machine from your nearby LIMA distributor, or write to Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

COMPARE LIMA QUALITY
. . . features and available equipment:

- Independent propel
- Load-lowering device
- Extra high-speed hoist attachment
- Third drum
- Power-reversing hoist drum
- Heavy-duty and special lightweight booms
- Telescopic boom stop with automatic shutoff
- Steering controlled by gear-type jaw clutches
- Electric lighting equipment
- Torque converter drive
- Anti-friction bearings at all important bearing points

QUALITY CONSTRUCTION

One-piece carbon steel rotating truck base . . . fabricated steel machinery frames . . . machine-cut gears . . . heat-treated steel ground shafting . . . large diameter clutches and brakes.

THE LIMA LINE INCLUDES:

SHOVELS	CRANES	DRAGLINES	PULLSHOVELS
to 6 cu. yds.	to 110 tons	variable	½ to 2½ cu. yds.

Smaller machines available on rubber

SEE THE NEW LIMA 1250 AT THE ROAD SHOW, BOOTH 506 ARENA IN CHICAGO, JAN. 28—FEB. 2.

DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD

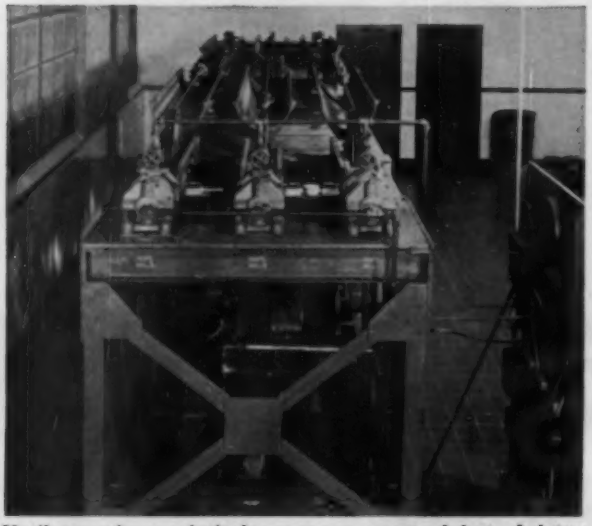
LIMA SHOVELS · CRANES DRAGLINES · PULLSHOVELS

BALDWIN BLH LIMA-HAMILTON

BALDWIN-LIMA-HAMILTON
Construction Equipment Division — LIMA WORKS

OTHER DIVISIONS: Austin-Western • Eddystone • Electronics & Instrumentation Hamilton • Loewy-Hydropress • Madsen • Pelton • Standard Steel Works

Tuffy Wire Rope Tips



Until recently, a relatively meager amount of factual data has been available for estimating life expectancy of wire rope. Predicting how much service life could be expected from a given wire rope construction under a given set of operating conditions was largely a matter of guess-work, trial-and-error and generally inexact calculations.

Since bending stresses are a major factor in wire rope life, Union Wire Rope engineers designed the Accelerated Fatigue Tester, shown above, with which to pin down the effects of bending on wire rope. Now, from a long and exhaustive series of bending tests, scientific data has been accumulated and organized to take the place of former rule-of-thumb methods.

The data established by this laboratory research is based on the effect of various sheave diameters on bending stresses of various constructions of wire rope.

From test data, bending-life curves have been plotted by Union Wire Rope engineers for each of the more widely used rope constructions. Analysis made on each of these curves showed them to follow a pattern expressed by the curve shown in Fig. 1.

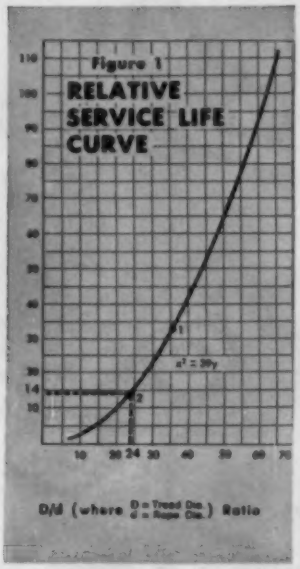


Table 2

BENDING-LIFE FACTORS

When Using Curve of 6x30 FW

CONSTRUCTION	FACTOR
6x7	0.57
18x7	0.67
6x17 Seale	0.73
6x19 Seale	0.80
6x21 Filler Wire	0.92
6x25 Filler Wire	1.00
6x31	1.00
8x19 Seale	1.14
6x37	1.33
8x19 Warrington	1.33
Tiller Rope	2.00

Table 3

SHEAVE DIAMETER FACTORS

ROPE CONSTRUCTION	GENERAL PURPOSE RANGE D/d Ratios where D = Tread Dia. d = Rope Dia.	
6x7	63	48
18x7	54	36
6x17 Seale	49	30
6x19 Seale	45	30
6x21 Filler Wire	39	26
6x25 Filler Wire	36	24
6x31	33	22
8x19 Seale	31	21
6x37	27	18
8x19 Warrington	27	18
Tiller Rope	18	12

Note on Fig. 1 the curve shows that as the ratio of tread diameter to rope diameter increases (see D/d figures at bottom of chart) the longer the relative service life as expressed by the figures at the left of the chart.

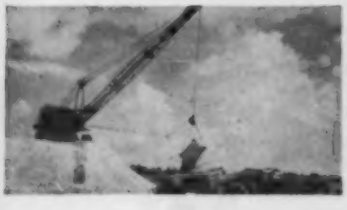
However, there are few pieces of equipment on which sheave and drum sizes can be large enough to afford D/d ratios above 50. From test data the general-purpose range of D/d ratios was determined. Those recommended are set up in Table 3.

Spotted on the curve, for example, is the D/d ratio of 24 at point 1 and D/d ratio of 36 at point 2—these being the range for general purposes taken from Table 3 for the 6x25 filler

Tuffy Special Wire Ropes are tailored to special use. Ordering is easy:

Tuffy Scraper Rope

Moves more yardage per foot because **Tuffy** Scraper Rope is specially built to take the beating of extreme drum-crushing abuse. Flexible; withstands sharp bending; hugs sheave grooves and winds snugly and smoothly on drums. High resistance to load shock on slack line.



Tuffy Dragline Rope

Longer-wearing line for all dragline operations. Special abrasion resisting construction which also gives extra flexibility. Tuffy Draglines also spool better, ride better on grooves and hold tightly to drums when casting. Consistently dependable in handling any material—wet or dry dirt, sand, gravel, rock, cement or minerals.

How to predetermine wire rope life

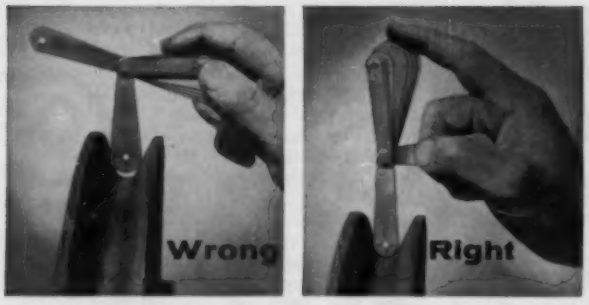
Here's the easier, surer way developed by Union Wire Rope Corporation Engineers

rope. Moving from these points to the left on the chart, the relative service life of this rope ranges from 14 to 34 units of any service measure used, such as yards, tons, days, etc.

Now to determine the relative service life of say a 6x37. Its bending life factor (see Table 2) is 1.33 as compared to 1.00 for the 6x25 filler wire. Multiply the service life readings of 14 and 25 for the 6x25 filler wire by 1.33, and we find the service life range of the 6x37 falls at 18 and 27 units of service. Relative service life of other ropes are determined in the same way by using the bending factor indicated for each as the multiplier.

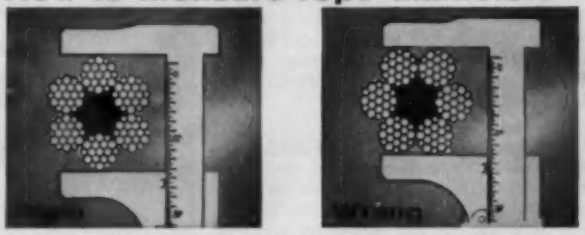
Of course bending is not the only wear factor in wire rope operation, and the general rule—that more flexible ropes should be used as bending stress increases with decrease in diameter of sheave or drum—has to be modified in field use. In fact there are eight other principal operating conditions, in addition to bending stresses, that affect wire rope service life. They are loading conditions, portability, corrosion, abrasion, rope speeds, materials handled, and equipment design.

What Size Rope?



Check groove diameter: When new wire rope is to be used on old equipment, make sure the tread or bearing surface of all sheaves is of sufficient groove diameter to avoid pinching the rope.

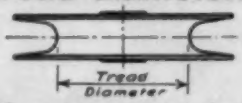
How to measure rope diameter:



Use a machinist's caliper. Be sure to measure the widest diameter.

How to measure tread diameter:

Select the smallest sheave or drum to be used with the new wire rope, and measure actual diameter of tread.



Sheaves with grooves corrugated with rope lay impression should be replaced with new ones before installing new wire rope.

New wire ropes are usually over-size. It is advisable to have groove diameters of sheaves or drums as large as the actual calipered diameter of the new rope, or slightly larger. We recommend sizes as follows:

Diameter of Rope	Groove Diameters	
	Minimum	Maximum
½" and smaller	diameter + 1/32"	diameter + 3/32"
9/16-1"	diameter + 1/16"	diameter + 1/8"
1-1/16-2"	diameter + 3/32"	diameter + 3/16"
Over 2"	diameter + 1/8"	diameter + 1/4"

Following the above instructions, you will know the Diameter of Wire Rope to use to fit your equipment.

Just say **Tuffy** give length and size, and forget complicated specifications.

Tuffy Slings and Hoist Lines

Here's a team that cuts hoisting and down-time costs in all types of materials handling.

Tuffy Slings are made of a patented, machine-braided fabric that stays extra flexible, and isn't materially damaged by knotting or kinking.

Tuffy Hoist Line is a special construction with the extra flexibility and toughness for longer service life on overhead, stiff leg and mobile cranes, derricks and clamshells.

Tuffy Dozer Rope

Long after ordinary ropes are worn out, **Tuffy** Dozer Rope has the stamina it takes to keep on handling the blade. 150' reels of 1/2" or 9/16" mounted on your dozers let you cut off worn sections without wasting good rope. This unbeatable combination piles up sizeable savings on dozer rope costs.

Your Tuffy Distributor is ready to help you with any wire rope problem.

If you aren't acquainted with him, look under "Wire Rope" or "Slings" in the classified pages of your telephone directory.

FREE! New "Rope Dope" Educational Bulletins

They're packed with boiled-down, useful information on the selection and care of wire rope for greatest service. Just ask your Tuffy Distributor to put your name on his mailing list.

union Wire Rope corp.

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Specialists in high carbon wire, wire rope, braided wire fabric, stress relieved wire and strand

Personal Notes

Boone County Coal Corp., Sharples, W. Va., has appointed **Richard F. Wesner** its general manager. Mr. Wesner had been acting general manager since May, 1956. He became associated with Boone County Coal in 1954 as a sales engineer. In 1955 he was transferred to Sharples. A former employee of the McNally Pittsburg Mfg. Corp., Mr. Wesner supervised installation of a number of preparation plants in the Sharples, W. Va., area from 1948 to 1954. Before his appointment as acting general manager last year, Mr. Wesner had been Boone County Coal's chief engineer.

J. M. Krese, superintendent of mechanized mining, has been appointed superintendent of the Banning coal mines owned by Republic Steel Corp. at Van Meter near Smithton, Pa. Mr. Krese, an associate of Republic since 1948, is a member of the Pittsburgh Coal Mining Institute and three engineering honorary societies.

Charles H. Dodge, until recently, mining health and safety engineer, U. S. Bureau of Mines, Pittsburgh, Pa., has been transferred to the Office of Internal Revenue as valuation engineer, Tax Audit Div. He will remain in Pittsburgh. Before serving in Pittsburgh Mr. Dodge had been chief of the Health & Safety Branch, Bureau of Mines, Jellico, Tenn. At one time he was employed in the operating department of the H. C. Frick Coke Co. He was also a research engineer for the Associated Coal Companies of U. S. Steel Corp. and safety director of the Buckeye Coal Co.

Charles H. Dodge

James W. Miller, University of Pittsburgh lecturer and former preparation engineer for the U. S. Bureau of Mines, has joined the staff of the consulting firm of Robinson & Robinson, Charleston, W. Va. Mr. Miller will head the Company's preparation department.

William Guiney, superintendent of Zeigler No. 3 mine, Bell & Zoller Coal Co., Ill., retired November 30. Mr. Guiney began working for Bell & Zoller in 1925 as a tracklayer at Ziegler No. 2 mine. Promoted to foreman in 1926, he worked in that capacity until 1928 when the company moved him to the Centralia mine. In 1936 he was returned to Ziegler No. 2 as mine manager.

J. M. Krese has been appointed superintendent of Republic Steel's Banning coal mines, Van Meter, Pa. Mr. Krese, an associate of Republic since 1948, was formerly superintendent of mechanized mining.

Marvin E. Hall has been appointed division superintendent of the Amonate and Bishop mines, Pocahontas Fuel Co., Inc. Mr. Hall worked for Pocahontas from 1921 to 1949. From 1949 to 1954 he was a federal mine inspector. From 1954 to 1956 he was employed by the Glogora Coal Co. as superintendent. He returned to Pocahontas last August.

Adam Robinett, a former section foreman at Island Creek Coal Co., has been appointed resident mining engineer of Youngstown Mines Corp., Dehue, W. Va. During his career in coal Mr. Robinett served Eastern Gas & Fuel Associates as powerhouse fireman and as chief night mechanic. After a tour with Semet Solvay Div. as general mine labor and lab technician, he moved to Island Creek as an industrial engineer.

Thomas O. Long, Madisonville, Ky., has been elected president of the Western Kentucky Mining Institute. He succeeds **Morton Jones**, Beaver Dam, Ky.

(Continued)

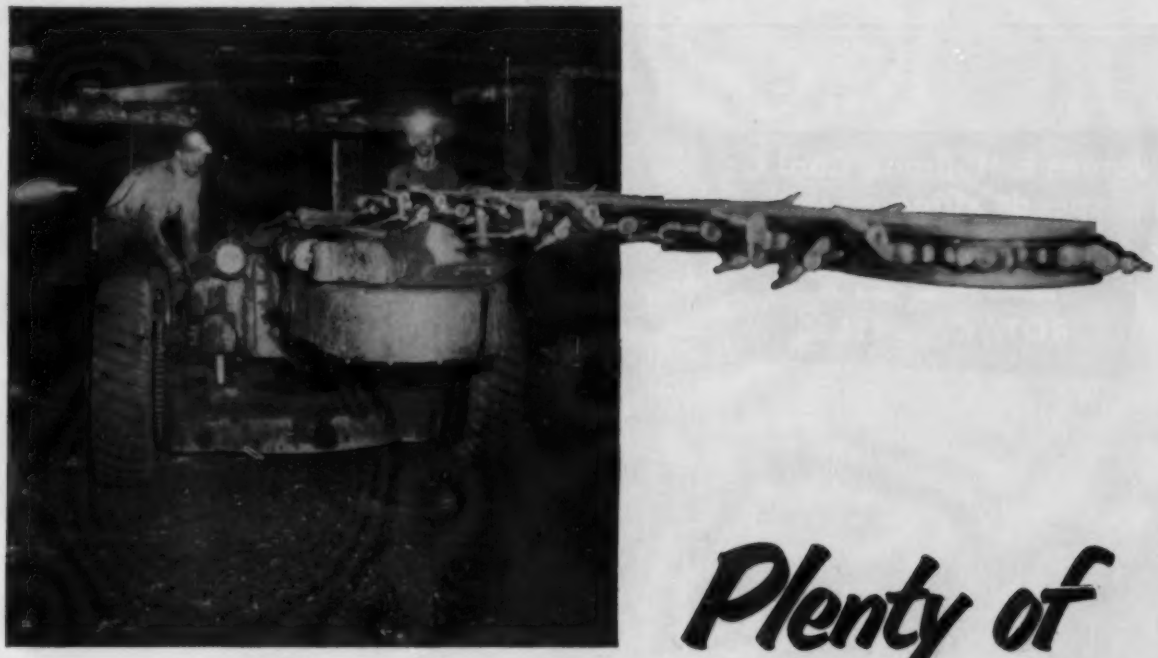
George H. Love

A. R. Matthews

Matthews Heads Pitt Consol; Love Elected *Chairman*

Armstrong R. Matthews, president, Pocahontas Fuel Co., Inc., was elected president of Pittsburgh Consolidation Coal Co. Dec. 18, by a vote of Pitt Consol's board of directors. At the same time the board named George H. Love, Pitt Consol's president for 11 yr, chairman of the board. The change in company leadership followed a stock trade action between Pitt Consol and Pocahontas (*Coal Age*, September, 1956, p 118) in which Pitt Consol gained control of Pocahontas. Mr. Matthews entered the coal business with the Consolidation Coal Co. at Fairmont, W. Va., in 1926. He has been president of Pocahontas since 1951. At 54 yr of age his newest appointment is the culmination of service in coal that moved him through jobs of responsibility with such companies as Consolidation's Pocahontas-New River Div. (division superintendent); the Fairmont Div. (division superintendent); Philadelphia & Reading Coal & Iron Co. (engineering); Clover Splint Coal Co. (manager of operations); and Clinchfield Coal Corp (executive vice president and president).

Mr. Love, who entered coal in 1926 after 4 yr in the investment field, acquired his first industry job with Union Collieries Co. He became Union's president in 1933. By 1943 he had become executive vice president and chairman of the executive committee of the Consolidation Coal Co. in a move that is considered the first step toward formation of what is today the Pittsburgh Consolidation Coal Co.



Plenty of Mining Experience behind these Carbide Bits

CARMET DISTRIBUTORS

Persinger Supply Co., Williamson, W. Va.
Persinger's Inc., Charleston, W. Va.
Leechburg Supply Co., Leechburg, Pa.
Oglebay, Norton & Co., St. Clairsville, Ohio
Drillmaster Supply & Mfg. Co., Evansville, Ind.
Crandall Engineering Co., Inc., Birmingham, Ala.
Carbon Transfer & Supply Co., Helper, Utah
Carlsbad Supply Co., Carlsbad, New Mexico
McCombs Supply Co., Jellico, Tenn.
Union Supply Co., Denver, Colorado
Consolidated Supply Co., Picher, Okla.
W. B. Thompson Co., Iron Mountain, Mich.

★ ★ ★

Write for your copy of the CARMET MINING TOOL CATALOG

This informative 16-page booklet gives complete data, sizes, etc. on all styles of Carmet carbide-tipped cutter and drill bits. Also included is a valuable methods manual on reconditioning methods and equipment. Your copy gladly sent free on request.

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Carmet carbide bits were developed and proved *the hard way* . . . through years of service in every conceivable mining condition and in every mining area. Case histories vary considerably due to local conditions—but no matter what your cutting or drilling problems may be, we can show you records of superior performance by Carmet bits under similar circumstances.

As a direct result of this field-proved background, Carmet bits offer you several distinct advantages. One is the unusually wide range of selection: 15 different styles of cutter bits, 2 styles of finger bits, 2 styles of roof bolting bits, 4 styles of auger bits. More bits to pick from means a closer match with *your* conditions—means savings for you in time and bit costs. Another advantage was *pioneered* by Carmet . . . it's the overlaying cap of steel that double-bonds each carbide cutter tip firmly in its seat, guarding against tip loss and reducing side drag and power consumption.

How about giving Carmet bits a trial? Both we and your local distributor will be glad to cooperate with you. ***Allegheny Ludlum Steel Corp., Carmet Div., Wanda and Jarvis Aves., Detroit 20, Michigan.***

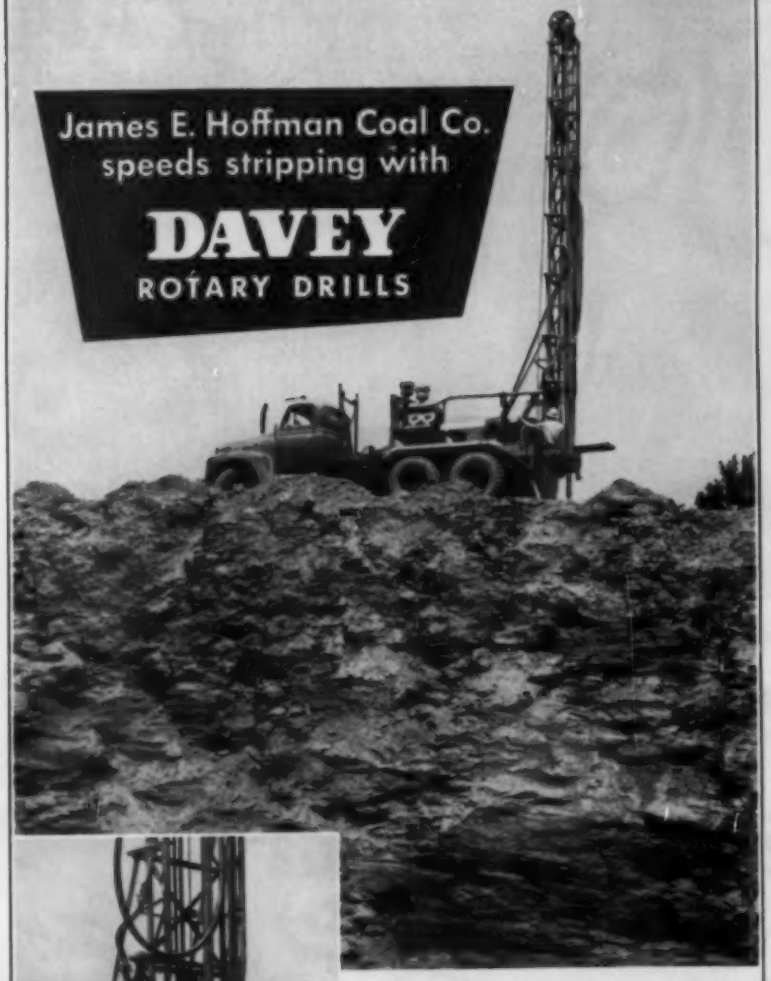
The Original DOUBLE-BONDED Carbide Bit

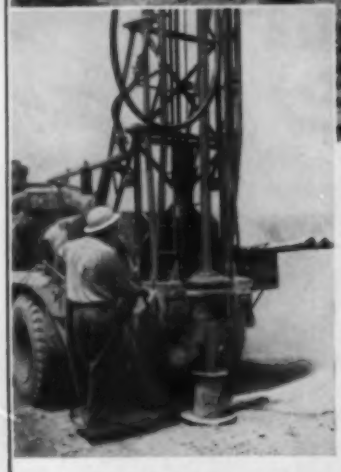
CARMET® AL

WSW 6101

James E. Hoffman Coal Co. speeds stripping with

DAVEY
ROTARY DRILLS





Like other leading mine operators, James E. Hoffman Coal Co., Karthaus, Pa., speeds drilling and cuts costs with Davey Rotary Drills.

Daveys are suitable for mounting on any make of truck . . . move fast between blast holes . . . are ideal for low cost core drilling . . . are easy to set in drilling position. Whether it's 60 ft. for overburden, as shown, or 2,000 ft. for oil, gas or water, your drilling can be done more economically—with less downtime —with Davey Rotary Drills. AA-1086

Write for full details!

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pioneers of "air-cooled air"

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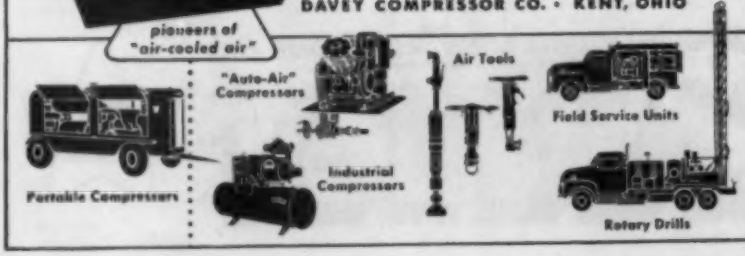


Personal Notes *(Continued)*

C. R. Nailler, president of Christopher Coal Co., has announced these personnel changes:

Harold T. Suter has been elected vice president, operations, and general manager; **William Barnard** has been appointed general superintendent in charge of Arkwright mine, Osage, W. Va., and Booth mine, Edna, W. Va.; **Cleon Fowler** has been appointed general superintendent of Osage mine and Pursglove mine; **Richard Lee** has been appointed acting superintendent, Pursglove mine; and **William Poundstone,** superintendent of Humphrey mine.

Seven men employed by the Coal Div., Eastern Gas & Fuel Associates, have been transferred or promoted, according to an announcement by **H. John Harper,** vice president. The changes:

H. A. Quenon, former low volatile division manager, has been moved to assistant production manager with headquarters in Pittsburgh; **E. H. Shaw,** former superintendent of Federal No. 1, has been promoted to low-volatile division manager with an office in Beckley, W. Va.; **William Laird,** former superintendent at the Kopperston operation, has been transferred to superintendent of Federal No. 1; **U. A. Cobb,** former superintendent of Wharton No. 2, has been transferred to superintendent of the Kopperston mine; **D. B. Shupe,** former superintendent of Wharton No. 1, has been transferred to No. 2; **R. H. Freeman,** production engineer, low-volatile division, has been promoted to superintendent at Wharton No. 2; and **K. S. Hobbs,** production engineer, Federal No. 1, has been promoted to production engineer, low volatile division.

Eastern Gas & Fuel Associates also announced these recent Coal Div. transfers and promotions:

John Kalasky, formerly resident engineer at Keystone mine, transferred to the Pittsburgh engineering department as ventilation engineer; **E. P. Sheriff,** former resident engineer at Helen, transferred to Keystone as resident engineer; **John Ketz Jr.,** former transitman at Keystone, promoted to resident engineer at Helen; **C. J. Kirby,** former production engineer of low volatile division, transferred to Helen as superintendent; **Raymond Snyder,** employed as resident engineer at Wharton No. 2; **John Kodak,** assistant mine foreman at Keystone, transferred to Stotesbury No. 10 as general mine foreman; **S. R. Barrett,** resident engineer at Federal No. 1, transferred to Colver as resident engineer.

MEETINGS

AIME, Annual Meeting, Feb. 25-27, Roosevelt and Jung Hotels, New Orleans, La.

National Coal Association, Annual Convention, June 4-6, Hotel Shoreham, Washington, D.C.

Now . . . most power of the low-priced 3

New DODGE *PowerGiants*

1957 line-up gives you up to 232 hp.

Dodge tops the low-priced field in V-8 power by a big margin—actually delivers as much as *31% more!* This *extra* power in reserve saves engine strain . . . wear . . . excessive repairs. What's more, Dodge V-8's use *regular* gas, help keep your cost per ton-mile *down!*

Extra payload capacity. You can haul more—up to 73% more in the 300 model pick-up, for example.

Extra handling ease. Exclusive push-button automatic transmission*! Sharpest turning and easiest steering in the industry!

See the new *Power Giant* line-up now at your Dodge dealer's. You'll see features that prove it pays to get your Dodge dealer's deal before you decide on *any* truck.

**Available on all low-tonnage and Forward-Control models.*

DODGE meets your hauling needs!

Conv. Models	Max. G.V.W.	Max. G.C.W.	Max. V-8 HP.
100	5,100 lbs.	—	204
200	7,500 lbs.	—	204
300	8,800 lbs.	—	204
400	15,000 lbs.	26,000 lbs.	197
500	18,000 lbs.	32,000 lbs.	197
600	21,000 lbs.	35,000 lbs.	197
700	23,000 lbs.	45,000 lbs.	216
800	25,000 lbs.	55,000 lbs.	222
900	30,000 lbs.	65,000 lbs.	232
Forward-Control Models			
P300	9,000 lbs.	—	204
P500	15,000 lbs.	—	204
C.O.E. Models			
C500	18,000 lbs.	32,000 lbs.	197
C600	21,000 lbs.	35,000 lbs.	197
C700	22,500 lbs.	45,000 lbs.	216
Tandem Models			
T700	32,000 lbs.	45,000 lbs.	216
T800	36,000 lbs.	55,000 lbs.	222
T900	46,000 lbs.	65,000 lbs.	232

DODGE TRUCKS

WITH THE *FORWARD* LOOK

Pick-ups

Stakes

Tractors

* Best for Sub-Zero Lubrication

Highly recommended for general grease applications on all types of machines operating at very low temperatures. Remains plastic at temperatures as low as 70° F below Zero and has a Melting Point of 270° F. Possesses high film strength and is of a consistency that meets all requirements. Can be easily applied through grease guns or by other means of application. LOW TEMP LUBRIPLATE is waterproof and will protect automotive and other types of equipment against the unfavorable effect of salt or calcium chloride as used on highways during winter months.

REGARDLESS OF THE SIZE AND TYPE OF YOUR MACHINERY, LUBRIPLATE LUBRICANTS WILL IMPROVE ITS OPERATION AND REDUCE MAINTENANCE

For nearest LUBRIPLATE distributor see Classified Telephone Directory. Write for free "LUBRIPLATE DATA BOOK"... a valuable treatise on lubrication. LUBRIPLATE DIVISION, Fiske Brothers Refining Company, Newark 5, N. J. or Toledo 5, Ohio.

Among the Manufacturers

This was news:

General Electric Co. created a new operating department because of an expanding market in communications. Named the Communications Products Dept., the unit will absorb functions handled by the company's Communication Equipment Section. Products will include mobile radio, microwave radio relay, radio traffic coordination units, power line carrier equipment. Harrison Van Aken, Jr., former head of the Communication Equipment Section, heads the new department.

Kennametal, Inc., began full production in a new plant near Latrobe, Pa. The facility houses the company's special products grinding department, where it produces hard carbide metals known as "Kennametal" and "Kentanium." The new Latrobe plant contains 24,000 sq ft of floor space, houses 100 men, and is situated on a 1,200-acre tract. In 1954 the company's main Latrobe plant was flooded at a loss of $450,000.

Lee O. Witzenburg, formerly general sales manager of the Cleveland Worm & Gear Co., and of its affiliate, the Farval Corp., was appointed vice president in charge of sales for both companies. Mr. Witzenburg became associated with CW&G in 1950.

Thor Power Tool Co. opened a branch office in Indianapolis as headquarters for regional operations in southern Indiana and western Kentucky. The company manufactures portable air and electric power tools.

Clark Equipment Co., Construction Machinery Div., appointed Kansas Engine & Equipment Co., Inc., a sales and service representative of the Michigan tractor shovel line. Kansas Engine & Equipment, situated at 2015 S. W. Boulevard, Wichita, Kan., will work in all but eight Kansas counties.

Warner Co., 3625 E. 48th Ave., Denver 16, Colo., was appointed distributor of Parker tube and hose fittings and tube-working tools by Parker Appliance Co., Cleveland, Ohio. Warner will service the Colorado area.

J. A. Appleton replaced C. E. Stoltz, retired, as general manager of Goodman Mfg. Co.'s Mancha Storage Battery Locomotive Div. In addition, the company retained R. M. Ansel as chief engineer. In another personnel move Goodman, named Ronald Whiton a sales engineer, who will represent the company in Michigan, Minnesota and part of Canada.

Robert L. Knox and Herman R. Brown were appointed assistant sales managers by the Frank G. Hough Co., Libertyville, Ill., subsidiary of International Harvester Co., Mr. Knox, a district sales representative before the new appointment, will take charge of distributor sales and contacts with field personnel. Mr. Brown, formerly manager of the order and distribution section of the sales department, will direct manufacturers sales as well as schedule operations.

Richard C. Garland joined Charles F. Gross Associates, Philadelphia sales representatives for C&D Batteries, Inc., Conshohocken, Pa.

Arthur A. Archer was appointed vice president, engineering, for Mosebach Electric & Supply Co., Pittsburgh, Pa. Mr. Archer, responsible for the development of Mosebach's industrial motor resistor, spent a number of years in resistor design for the coal industry. In 1927 he was an assistant engineer in design and construction for the Pittsburgh Coal Co., later became chief engineer of a subsidiary plant. He is responsible for the design and construction of Pittsburgh Coal's 1,000 tpd Disco plant.

Dorr-Oliver Inc., Stamford, Conn., appointed the West Virginia Pump & Supply Co., Huntington, W. Va., and the Chemical Pump and Equipment Corp., Cleveland, Ohio, distributors. West Virginia Pump and Supply will market and service D-O pumps for the chemical and coal mining areas of southern West Virginia, Virginia, Kentucky and Ohio. Chemical Pump and Equipment will handle the D-O lne in central and northern Ohio.

Rental Service Co., 4605 N. 4th St., Philadelphia, Pa., will sell P&H diesels in three states under an agreement reached with the Diesel Engine Div., Harnischfeger Corp., Crystal Lake, Ill. Rental Service Co. will also sell the P&H diesel powered electrical generating sets in the same three-state area—Delaware, part of Pennsylvania and part of New Jersey.

E. S. McCormick was appointed general sales manager of the Buffalo-Springfield Roller Div., Koehring Co. The appointment follows last month's merger announcement of Buffalo-Springfield and Koehring.

The appointment of James H. Boring as Pittsburgh division manager of The General Tire & Rubber Co. has been announced by L. L. Higbee, trade sales manager. As head of the newly formed division, Mr. Boring, former division manager at Richmond, Va., will direct sales of General tires and related products in the New York, Pennsylvania and Maryland areas.

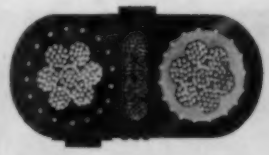
J. H. Humberstone, president of Air Reduction Sales Co., a division of Air Reduction Co., Inc., announced the company's acquisition of the assets and

Parallel Duplex (Flat Twin) Mining Machine Cable—600 Volts
(Ungrounded or grounded)

Single-Conductor Locomotive Gathering Cable—600 Volts

Portable Power Cables—Two, Three and Four Conductors
(Ungrounded up to 3,000 Volts, or grounded up to 5,000 Volts)

Three-Conductor Mine Power Feeder Cable
(Shielded with ground wires up to 10,000 Volts)



Rome's shuttle car cable can't be damaged by bending

The rugged Neoprene jacket forms a resilient web between insulated power conductors and ground conductor for maximum impact resistance. The open braid on each conductor firmly interlocks conductors to the sheath as a sturdy integral unit. A greater number of finer strands in power and ground conductors—plus a closely woven fibrous covering around the ground conductor (to minimize mechanical working of the fine strands)—increase over-all flexibility. These two features, together, prevent the damage that constant flexing, twisting, and tension might otherwise cause.

Vulcanized in lead for extra toughness

Rome 60 mining cables are built for rugged duty, both above and below ground

These tough Rome cables have a much longer service life than ordinary cables. This is of dollars-and-cents importance to you because it can mean less down time, reduced replacement expenses, and increased production.

Here are some of the construction features that make Rome 60 cables your best mining cable buy:

Conductors. All conductors are of finely stranded copper wires for maximum flexibility.

Insulation. A long-aging, heat- and moisture-resistant rubber compound permits operation at 75° C., thereby providing overload protection. For high-voltage service, an ozone-resistant insulation is used.

Reinforcements. On Rome 60 portable cables, a heavy reinforcing open braid locks the Neoprene jacket to the inner construction to prevent failure from twisting, pulling, flexing and sheath separation.

Jacket. Neoprene vulcanized in a continuous lead mold provides durability and high resistance to abrasion, acids, oils and flame. All Rome 60 mine-trailing cables are surface-molded "P-105 BM" indicating full compliance with Federal and State of Penn. safety codes.

Specify Rome 60 mining cables for your next job. Contact your nearest Rome Cable representative for more information—or write to Department 176, Rome Cable Corporation, Rome, New York.

ROME CABLE
CORPORATION

NEW...

500X
FLEXCO HINGED
BELT FASTENERS
for Underground
Coal Mining

★ Make smoother joints
★ New Nylon covered cable pin
★ No pin migration
★ Complete packaged joints

Standardize on
FLEXCO 500X Fasteners

★ Packaged joints — complete, convenient, no waste.
★ New Power Tools cut application time.
★ Stocked by leading distributors.
★ Field engineers are ready to assist you.

(Fasteners also available in bulk — nylon covered cable pin stock in 100 ft. and 200 ft. rolls.)

Ask for Bulletin No. 500X
See Your FLEXCO Distributor

FLEXIBLE STEEL LACING CO.
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FLEXCO Hinged
500X Belt Fasteners

Manufacturers *(Continued)*

business of Jackson Products, Inc., Detroit, Mich. Jackson Products manufactures welding electrode holders, helmets, safety goggles and other welding supplies. Air Reduction appointed A. C. Gilbert general manager of the new property.

Dorr-Oliver, Inc., opened a new office in Baltimore, Md., to serve industries in the Mid-Atlantic states of Virginia, West Virginia, Maryland and Delaware. Sales engineers Kelsey C. Lindstrom of the company's Eastern Industrial Div. and Benjamin F. Rockecharlie of the Eastern Sanitary Div. were transferred to the new office.

Warren Steam Pump Company, Inc., Warren, Mass., completed plans to open a second plant, this one at Peace Dale, R. I. Operations will begin this month. Warren manufactures reciprocating pumps and centrifugal pumps. In 1950 the company acquired the Quimby Pump Co., a manufacturer of rotary and screw pumps.

Pickard Industries, Inc., has organized to operate the Central Mine Supply Co. and the Tamping Bag Co., according Alfred E. Pickard, president. Executive offices will remain in Mt. Vernon, Ill., and a branch at Madisonville, Ky., will remain under the management of William E. Arnold.

Randolph H. Jackson was appointed director of sales of the Boston Woven Hose & Rubber Co., Boston, Mass. Mr. Jackson will direct all sales activities of Boston's Industrial Rubber Products Div.

Alfred L. Olson was named general sales manager of the Chicago plant of Joseph T. Ryerson & Son, Inc., steel distributor. The office of sales manager vacated by Mr. Olson was taken by Robert A. Daggit and Scott Vrooman.

George R. Lawson was appointed director of marketing of Pennsalt Chemicals' Industrial Div. In the newly created post, Mr. Lawson will direct the combined sales organizations of the former Sharples and Industrial Chemicals Divs., recently consolidated during the formation of the company's Industrial Div. An extensive line of organic and inorganic industrial chemicals and Sharples brand organic chemicals are made in the Industrial Div. facilities.

C. L. Fuessler and Raymond H. Peterson were newly-named as regional servicemen in the Allis-Chalmers Industries Group. Mr. Fuessler was assigned to the company's Midwest region with headquarters in St. Louis. Mr. Peterson was assigned to the North Central region with headquarters in Chicago, Ill.

COMMUNICATION and CONTROL

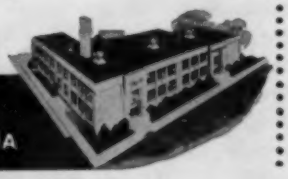
TROLLEYPHONES
Most widely used communication for underground haulage.

AUDIOPHONES
Finest communication between control points in cleaning plants.

CONTROLS
Save time and money by remote control of pumps, fans, sub-stations, etc.

Femco systems were first in the mines and are today first in quality and dependability.
Get the facts. Submit your problem for a proposal.

SALES AND SERVICE AGENCIES
National Mine Service Co., Beckley, W. Va.
Industrial Physics & Electronic Co.,
Salt Lake City, Utah



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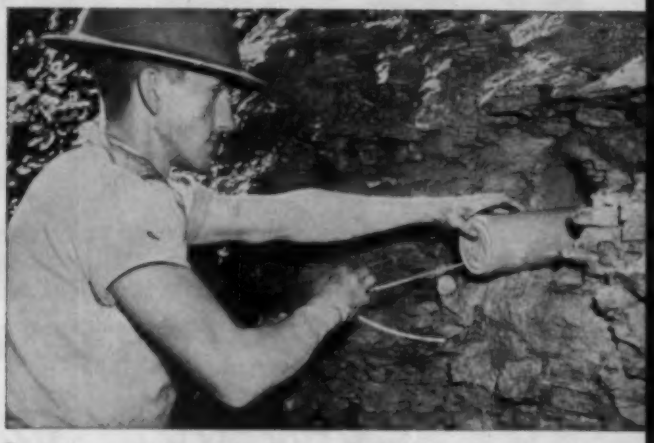
Femco Inc. IRWIN, PENNSYLVANIA

Pa. company switches to Du Pont NITRAMITE®— saves 10% on shooting cost alone

SAVES ALSO ON HANDLING AND LOADING—AND WORK IS SAFER

1. "Nitramite" blasting agent goes into 60′ hole at one of Shawsville Mining Co.'s bituminous pits near Clearfield, Pa. "We started using 'Nitramite' nearly a year ago," says Genl. Supt. James Hudson, "and it's cut our explosives bill a full 10%." But this saving's only part of the story.



2. "Nitramite" Primer going into the hole. "Nitramite" cannot be accidentally exploded by rifle bullets, shock, friction or blasting caps. It should be detonated by insensitive "Nitramite" Primers which, in turn, must be initiated with Primacord. This gives you safer blasting.

3. After loading and stemming the hole, workman ties branch line of Primacord to trunk line. Sand-rock overburden ranges up to 40′—yet "Nitramite" breaks the rock even in the toughest formations, and handling's easier, loading safer because it cannot cause headaches.

4. "Breakage is good even when we're shooting 7-8 cu. yards per lb. of 'Nitramite,'" Mr. Hudson adds—and the shot proves his point. Thanks to this Du Pont "team," Shawsville Mining removes about 2,500 tons daily from seams once considered unprofitable—and costs are at rock bottom.

Save when you buy, when you handle, when you load —use Du Pont "Nitramite" blasting agent. It's a product you can load today and shoot tomorrow—and it adds a new dimension in safety. For complete details, contact our representative or write: E. I. du Pont de Nemours & Co. (Inc.), Explosives Dept., Wilmington 98, Delaware.

DU PONT
BLASTING AGENTS
Products of Du Pont Explosives Research

DU PONT
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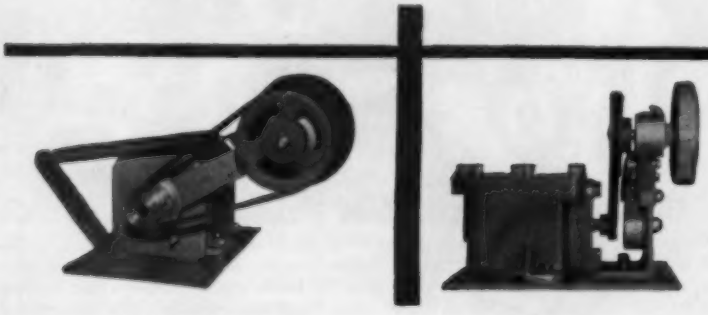
BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

"Watchdog" of your Conveyor System

ENSIGN Centrifugal Switches protect your belt conveyors against fire due to slippage on the pulleys. The switch, when used with a time delay, such as an Agastat, will automatically shut off motor when normal speed of belt conveyor is reduced due to interference.

• • • Saves replacement of expensive belting • • • prevents loss of tonnage due to down time • • • eliminates the hazard of fires • • • provides greater safety to workers • • • can be used for sequence operation of multiple belt system • • • operates forward or reverse direction.



Bulletin 1100 (Dust-tight)

Bulletin 1101 (Explosion-tested)

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New Books for Coal Men

Coal and Chemicals

Coal as a Raw Material, by W. Idris Jones. A survey of the actual and potential uses of coal as a raw material in the chemical industry. Subjects include high-temperature carbonization, low-temperature carbonization, gasification, coal as a source of carbon and miscellaneous products. *22 pp. 6x9¾-in; paper 4s, Royal Institute of Chemistry, 30 Russell Square, London W. C. 1.*

Fly Ash for Construction

Fly Ash for Use as a Construction Material is a handbook for architects, consulting engineers, contractors and builders and includes sources, specifications and uses of fly ash. *23 pp. 8½x11-in; paper. $1, Bituminous Coal Research, Inc., 121 Meyran Ave., Pittsburgh 13, Pa.*

Activated Carbon

"Columbia" Activated Carbon explains the properties of activated carbon that make it an excellent adsorbent. It also includes a list of the sizes available for different applications, activated coatings and special preformed shapes. *Catalog S-6450, National Carbon Co., 1300 Lakeside Ave., Cleveland 14, Ohio.*

National First-Aid Contest

National First-Aid and Mine Rescue Contest, Knoxville, Tenn., October 10, 11 and 12, 1955 is a complete report on the national contest. Included are rules, methods of scoring and problems worked by the teams. *I. C. 7764. Bureau of Mines, Publications-Distribution Section, 4800 Forbes St., Pittsburgh 13, Pa.*

Bituminous Output

YEAR TO DATE	PRODUCTION
Dec. 15, 1956	483,655,000
Dec. 17, 1955	450,359,000

1956 output 7.4% ahead of 1955. A month earlier output was 8.1% above 1955.

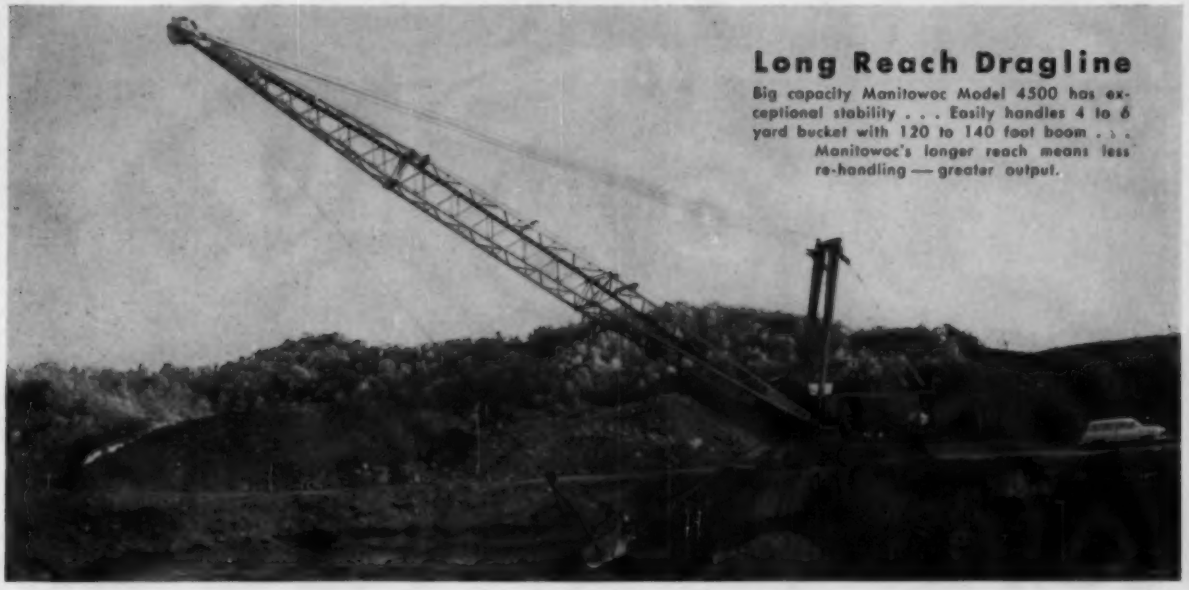
WEEK ENDING	PRODUCTION
Dec. 15, 1956	10,660,000
Dec. 17, 1955	10,686,000

Anthracite Output

YEAR TO DATE	PRODUCTION
Dec. 15, 1956	27,537,000
Dec. 17, 1955	25,306,000

1956 output 8.8% ahead of 1955. A month earlier 1956 output was 9.4% ahead of 1955.

WEEK ENDING	PRODUCTION
Dec. 15, 1956	628,000
Dec. 17, 1955	614,000



Long Reach Dragline

Big capacity Manitowoc Model 4500 has exceptional stability . . . Easily handles 4 to 6 yard bucket with 120 to 140 foot boom . . . Manitowoc's longer reach means less re-handling — greater output.

More Power • Mobility • Output

Miners throughout the world have found that they get *really profitable* stripping performance from the rugged, versatile Manitowoc 4500. Either as a dragline or shovel, Manitowoc means fast, economical stripping, regardless of the composition of the overburden.

Manitowoc, with a single diesel power package, is not hampered by the power loss in prime movers and D.C. generators found in electric rigs, and its simple design permits use of that *extra* power exactly where and when it is needed. In a Manitowoc, there are only four main shafts and 15 gears, and only *working* gears turn!

You get greater mobility with a Manitowoc — faster moves between job locations. You don't need cumbersome trailing electrical cables or extensive power networks . . . your Manitowoc will operate anywhere. The entire unit can be disassembled, moved and set up again by your regular mechanics in a matter of days.

Faster cycle speed boosts output. Torque converter drive provides precise control, balanced power loads and unlimited speeds without shifting. The torque converter matches engine power to the load so the engine cannot stall, cannot be overloaded.

Greater yardage means greater profit to you — and the Manitowoc 4500 is specially designed for big yardage mining. See why leading mines everywhere use Manitowocs. Get full details from your Manitowoc distributor.

Manitowoc Engineering Corp., Manitowoc, Wisconsin.

Hi-Lift Shovel

A 5½ yard bucket . . . Extra-strength high tensile steel shovel boom . . . Special 60-foot "Hi-Lift" boom and 37-foot dipper stick provide greater digging and dumping ranges . . . Single, free turning tubular dipper stick rolls through saddle, avoids the stress and strain of unusual digging shocks.

T. R. BALSINGER (left), Lewis Evans, L. S. Morgan and R. J. Trace present views on application of Pennsylvania's strip-mining laws.

JOHN HEIMASTER, design engineer, tells of new designs for Carbide Miner.

Making Strip Laws Work

CLARIFICATION of Pennsylvania's bituminous strip-mining laws and a description of the Carbide Miner were major matters discussed at a meeting of the Independent Mineral Producers Assn., Pittsburgh, Pa., Nov 30. This was the first general meeting of the group which was formed through a recent merger of the Independent Coal Operators Assn. and Mineral Producers Assn. Association officers are: President—W. C. Altvater, Pittsburg & Shawmut Coal Co., Kittanning, Pa.; Vice President—W. L. Harger, Sunbeam Coal Corp., North Washington, Pa.; Executive Vice President—F. H. Mohney, and Secretary Treasurer—J. P. MacFarlane, Butler, Pa.

Panel members for a discussion of state laws applicable to stripping were Lewis Evans, deputy secretary, and T. R. Balsinger, silviculturist, Pennsylvania Dept. of Mines and Mineral Industries, Ebensburg, Pa.; R. J. Trace, assistant attorney general, and L. S. Morgan, chief engineer, Sanitary Water Board, Pennsylvania Dept. of Health, Harrisburg, Pa. Session chairman was Alan R. Davidson, president, Maple Hill Coal Co., West Elizabeth, Pa.

Mr. Evans reported that the department is pleased with the cooperation received from strip-mine operators in complying with the law as it governs backfilling and reclamation of spoil areas. More operators now are registered under the law and former inequities of underbonding and laxity in enforcing reclamation requirements are being corrected. This heads off restrictive legislation, Mr. Evans said. Every operator has an interest in this impartial application of the law in view of his equipment and property investment.

Mr. Balsinger, emphasizing land restoration, pointed out that the process is primarily directed toward preserving the water table, preventing pollution and returning the land to a useful purpose. He urged operators to determine their needs for nursery products for the coming planting season and to place their orders with state nurseries at the earliest opportunity. This should be done not later than Feb. 15, 1957.

With respect to procedures, Mr. Balsinger explained that operators must backfill pits, then file a completion report with the department. The next step is to decide upon a future use for the land. Mr. Balsinger is prepared to help operators set up specifications for planting and to make a final inspection of the work. Trees should be on 6x6-ft centers, and a workmanlike job of planting insures survival of the stock.

Mr. Trace reported that no significant changes in the law are contemplated. He pointed out that the use of boney as a road-surfacing material was found to be a source of stream pollution, and he urged operators to use other materials wherever possible. On the matter of stripping permits, Mr. Trace stressed the importance of making early application in order to leave time for state engineers to make their inspection before operations begin. In an offer of free legal advice, Mr. Trace explained to the operators that in preparing leases with landowners, the operator should secure a right of reentry to correct violations. A violation on one job prevents the issuance of another permit, and if the operator does not have reentry rights he may not be able to correct this violation.

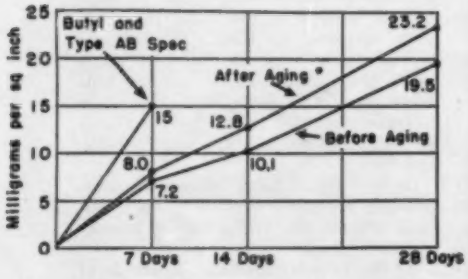
Mr. Morgan said that applications for stripping permits this year are about twice the number received last year. The rate of applications now is about 125 a month for new operations and reopenings. This places a heavy load of work on Sanitary Water Board inspectors, and the staff of the board has not increased. The need for getting applications on file early is apparent, because an operator cannot go to work without a permit.

"The industry is batting about 92% in its compliance with the law," Mr. Morgan said, in commending the operators for their cooperation. He pointed out that the Sanitary Water Board is taking a calculated risk in granting a stripping permit in a clean-stream area, but in most instances the operators have justified the Board's confidence.

John Heimaster, design engineer, Carbide & Carbon Chemicals Co., South Charleston, W. Va., presented as the final feature of the program a soundfilm on the operations of the remotely-controlled Carbide Miners, which is a continuous-type machine now used in mining under highwalls. Recent changes and plans for modifications in the immediate future point to a cost of $1.50 per ton of coal in the cars, Mr. Heimaster said in his introductory remarks. The launching platform is to be mounted on crawlers to facilitate tramming and setting up. The conveyors will be assembled in the form of a train to eliminate losses of time in adding and removing conveyor units. Record production so far is 860 tons in a single shift and 2,000 tons in 24 hr. The company has hopes of introducing the machine to the market after new designs have been tested.

Up out of harm's way, Anaconda 250MCM, 13,000-volt, grounded neutral, butyl-insulated, shielded, neoprene-jacketed cable delivers more power at lower cost to mine face in Colorado operation.

Go up to bring costs down—with Anaconda Mine Power Cable



Exceptional moisture resistance is provided by Anaconda Type AB butyl insulation, tests show. Type AB absorbs less than half as much moisture after 7 days as specifications permit.

With the trend to higher voltages in the mine – many companies are finding they can bring costs down by using overhead Anaconda butyl-insulated cable.

Cable is out of the way of damage by equipment, is easier to move, better for re-use. And there's no ditch to dig or fill, leaving a solid floor.

Even where moisture is a problem, you can outwit this enemy of long cable life with Anaconda butyl-insulated cable.

Latest tests show Anaconda's Type AB butyl high-voltage insulation absorbs far less moisture than industry standards permit . . . is many times better than competitive materials. And – Type AB's higher tensile strength gives you a stronger, sturdier cable.

New Engineering Bulletin EB-27 has full details on performance of Type AB insulation in 15 Industry Specifications tests. Ask the Man from Anaconda for your copy as well as information about Anaconda Aerial Cable. Or write: Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.

SEE YOUR ANACONDA® DISTRIBUTOR FOR MINE POWER CABLE

GEORGE C. TREVORROW, safety director, BCOA, describes mining in Turkey. Seated at left is J. T. Ryan Jr., retiring CMIA president.

PERSONNEL MATTERS—J. E. Osmanski, manager of personnel, Island Creek Coal Co., at rostrum. Seated left is J. A. Brookes, Mather Collieries, president-elect of the institute. Other speakers (left to right), Charles M. Gardner, Thomas King, M. E. Altimus, Jr.

New Directions for Coal

New ideas on safety-promotion, personnel selection, mine inspection and mechanized mining aired by coal-industry leaders at 70th annual meeting of Coal Mining Institute of America.

"IT IS DIFFICULT to place a dollar value on 7½ yr of peace in the industry, but it has resulted in three distinct advantages. These are (1) keeping old customers and adding new ones because of a dependable supply of coal, (2) avoiding the direct cost of shutdowns due to strikes and (3) increasing wages since 1950 in line with other industries, yet at a more reasonable rate than if the government had been a party in the bargaining."

These are the views of Edward G. Fox, president, Bituminous Coal Operators Association, which in the absence of Mr. Fox were presented by George C. Trevorrow, safety director, BCOA, at the annual banquet of the Coal Mining Institute at Pittsburgh, Pa., Dec. 13.

"We have shown that collective bargaining has worked and worked well. No longer do coal customers learn March 1 each year that a coal strike is a distinct possibility, and that their supply is limited to their present inventory," Mr. Fox continued. "As a result of stability won by direct negotiation with the United Mine Workers, we are selling more coal because the supply is dependable." In setting the stage for his views, Mr. Fox predicted an annual demand of 725 million tons by 1965, as compared with 505 million tons in 1956.

J. T. Ryan Jr., retiring president of the institute and president, Mine Safety Appliances Co., Pittsburgh, Pa., in his address at the opening session said that coal has seen significant changes in the past few years. The men in the industry, particularly supervisors, must be able people, in view of the value of equipment entrusted to them. Trained and capable men must be brought along within the industry. In this respect, coal differs from other industries in that while they can cross each other's lines in search of talent the coal industry must develop its own.

On the other hand, success in overcrowded industries may be remote, Mr. Ryan pointed out, while the opportunity in coal is broad.

At the two-day meeting, members of the institute elected new officers as follows:

President—J. A. Brookes, manager, Mather Collieries, Pickands, Mather & Co., Mather, Pa.

Vice presidents—D. C. Jones, director, Mineral Industries Extension Services,

MINE INSPECTION—L. D. Kimmel (left), Pa. Dept. of Mines; W. E. Hess, Jones & Laughlin; James Westfield, USBM, and J. D. Reilly, Hanna Coal Co.

Pennsylvania State University, University Park, Pa.; H. C. Rose, president, Pittsburgh Coal Co., Library, Pa., and J. D. Reilly, vice president, Hanna Coal, Georgetown, Ohio.

Secretary-Treasurer—J. M. Lowe, cost accountant, Hillman Coal & Coke Co., Pittsburgh, Pa., reelected.

At the opening session, Dec. 13, George P. Resick, mine inspector, Pennsylvania Department of Mines and Minerals, Spangler, Pa., described new ideas in accident prevention, and George C. Trevorrow presented an illustrated talk on coal mining in Turkey. Mr. Ryan presided.

SAFETY-PROMOTION IDEAS

In a strong plea for more accurate reporting of mine-incurred injuries, Mr. Resick pointed out that some do not report accidents unless they result in at least five days of lost time or are declared compensable. This distorts the trends, Mr. Resick said, in warning that such practices can only hinder the work of reducing accidents. Discrepancies resulting from such methods of reporting can be read from the statistics by anyone accustomed to reading and interpreting accident frequency and severity rates.

On specific ideas for accident prevention, Mr. Resick noted (1) Pennsylvania's program to investigate all roof-fall accidents, (2) publication and distribution of the Safety Sentinel to bring reports of specific accidents to the attention of mine personnel, (3) creating safety incentives and (4) making contact with mine workers to discuss safety problems, among others.

Turning to safety ideas developed at various mines, Mr. Resick listed the following:

1. Removal of wheel skids—Cut out 4 ft of ball of mine rail at destination and insert a build-up inside the rail to carry wheel flange, thus permitting wheel skid to fall out. Eliminates burns and injuries to fingers.

2. Tail section device—After a workman was seriously injured when caught between the tail section and frame of a loading machine, collective thinking on the problem devised a telescoping jack with a pin insert to prevent collapse of the tail section.

3. Remote control—A mining company and manufacturer collaborated on a remote control scheme to permit tramming a continuous miner from under bad roof without exposing the operator.

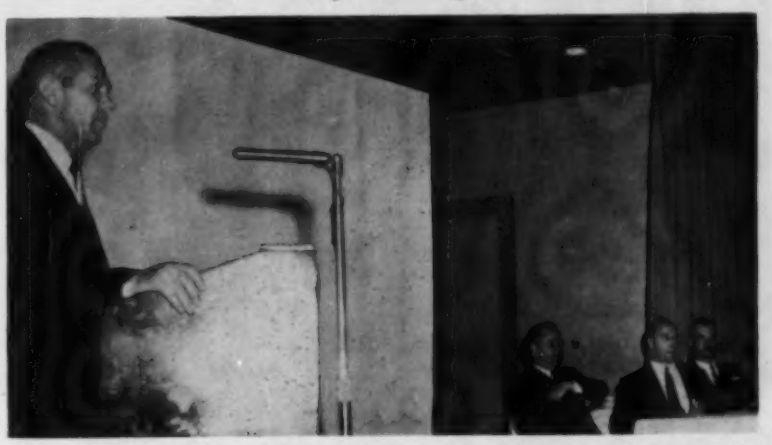
4. Belt-fire protection—An automatic sprinkling system was arranged along a belt conveyor with rose-metal links to actuate the sprays in the event of fire.

5. Fire extinguishment—The British have done some research on using a foam of water and detergent to smother fires. (See *Coal Age*, May, 1956, p. 90).

COAL MINING IN TURKEY

After recounting the history of the development of the Turkish coal-mining industry, which was recognized by Ataturk as the basis of Turkey's projected industrialization, Mr. Trevorrow described natural conditions in the Zonguldak area as particularly difficult. The roof is soft and requires extensive timbering, the cost of which is equivalent to $1.50 per ton. Many of the seams are steeply pitching and uniformity in thickness and continuity are lacking. In spite of these difficulties, praiseworthy strides have been made in designing shafts and other facilities for concentrated operations on a long-term basis. Mr. Trevorrow, before joining BCOA as safety director, served as a safety consultant in Turkey for a year as a representative of the Paul Weir Co., Chicago, mining consultants to the government of Turkey.

Other complications included the fact that a rotating labor force is necessary. Villagers from the surrounding countryside spend a month at the mines, then are returned to their farms, which they resist leaving for full-time mining. On the other hand, a program for training supervisors has been organized, including classwork and practical training in the jobs the trainees will later have to supervise. This may be one way to solve our own shortage of able supervisors, Mr. Trevorrow suggested.



CONTINUOUS MINING—J. A. Stachura (left), Enoco Collieries; H. C. Rose, president, Pittsburgh Coal Co.; Martin Valeri, Buckeye Coal Co., and James T. Jones, Mather Collieries, Pickands, Mather & Co.

CONVENTIONAL MINING—E. H. Jones (left), Rochester & Pittsburgh Coal Co.; H. C. Rose, session chairman, and John Rozance, Pittsburgh Coal Co.

Leading off in the Thursday afternoon session, J. E. Osmanski, manager of personnel, Island Creek Coal Co., Holden, W. Va., took up the problem of how to encourage high school graduates to enter the mining profession. Mr. Brookes, president-elect of CMIA, was session chairman.

RECRUITING TALENT

"We must begin to put our best features before the public. We get the biggest crowds together in our mining towns when we display the skills of our mine-rescue and first-aid squads. I don't blame a mother for telling her sons to go elsewhere for work after she hears the gory problems of a first aid contest and watches her husband being splinted, bandaged and tourniqueted from head to toe," Mr. Osmanski declared, in point-

Reduce Picking Table Labor ...Recover More Coal!

AMERICAN Heavy Duty "S" CRUSHER

CRUSHES ROM COAL, ROCK, SLATE, SULFUR BALLS AND GOB...WITHOUT OVERSIZE

A dozen installations of the new Heavy Duty "S" Crusher prove that it cuts labor costs by eliminating men at the picking tables.

It also offers important savings in recovered coal—coal that was formerly thrown away because of imbedded impurities. It is now crushed and washed for reclamation.

By cutting labor costs, by adding to your output, the new Crusher pays for itself in less than a year. From then on it's clear profit.

WRITE FOR LITERATURE.

American PULVERIZER COMPANY

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C. G. EVANS, North Americal Coal Corp., speaks on employee attitudes. D. C. Jones, Penn State, was chairman.

ing out that jet-plane piloting and space travel have captured the imagination of the young although the hazards in these are perhaps greater than those in mining. The difference is that these careers have been glamorized in young minds, and mining engineering can be, too.

Other suggestions as to what is needed to keep needed young talent in the industry include the refurbishing of mining towns, city management, smoke and dust control and anti-stream-pollution measures. More pleasant mining towns may even call for a return to company housing, but only if this step is taken with imagination and creativity. Salaries commensurate with other industries must be offered young engineers and technicians already within the industry, and only up-to-date promotional material, designed for the teen-age audience, should be employed at the high school level, Mr. Osmanski continued.

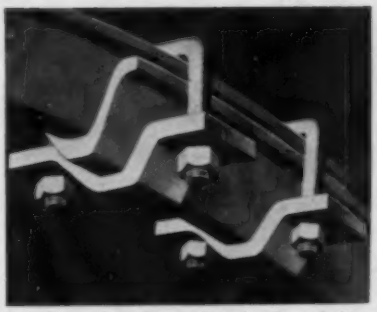
We ourselves must have a change in attitudes. If we need young people to

It's just good economics to use Bethlehem Yieldable Arches

Where conditions underground are difficult, mine roof support becomes a real problem. And that's where Bethlehem's Yieldable Arch sets can do an efficient job, and an amazingly economical one.

It's the "give" in the Yieldable Arch that does the trick. An individual arch is made up of segmental sections which nest into one another at the ends to form an overlapping joint. The joint is secured by U-bolt clamps drawn up tight enough to hold fast under normal loads. Struts are installed between arches to provide lateral stability.

When pressures become excessive, the joints yield and permit the overburden to settle slowly and form its own pressure arch. Thus safety



in the mine is maintained, mining operations can continue, and maintenance costs are reduced.

When the arch sets have served their purpose at one point, they can be salvaged and re-used elsewhere. Add this recoverability feature to the fact that Yieldable Arches far outlast timber supports, and you can see that it's just good economics to install the Yieldable Arch. One ore mine recently estimated that their Bethlehem arch sets paid for themselves within six months!

If you are interested in talking about the Yieldable Arch for your mines, or if you would like to learn how it is performing for others, one of our engineers will be glad to meet with you at your convenience. You can reach him through the nearest Bethlehem sales office.

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New Hi-Speed TIMBER JACK is TWO TIMES FASTER!

The dependability and safety of a screw-type jack with the fast operation of a crank! That's the combination offered in this new Simplex No. 642 Timber Jack. In mines, where fast timbering is often vital, this jack more than pays its way in doing the work of several men in raising and locating roof timber. With the head on a swivel, it can work right against a wall or rib. Capacity is 6 tons and there are five models with minimum heights as low as 3-ft., 6-in. and with maximum heights of 9-ft., 6-in.

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Type "F"

ROTATING HEADS To Fit All Timbers

Type "D" Type "E"

Ratchet Lowering Jacks for Thick, Medium and Thin Seams

Raise or lower notch-by-notch for greatest safety. Three sizes for all types of seams. Also ideal for lifting or skidding mine machinery, re-railing mine locomotives. Capacity 5 tons. Double-lever sockets permit lifting in close quarters.

A COMPLETE LINE OF MINE JACKS

The Simplex line also includes ratchet and screw mine roof and timber jacks, post pullers, track jacks, anchor jacks for use with conveyors, hydraulic jacks and the famous Re-Mo-Trol and Jenny "Center-Hole" Pullers.

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Emergency Jack with 4-way Lift Power

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RE-MO-TROL UTIL-A-TOOL **JACKS** JENNY ROL-TOE

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Industry Meeting *(Continued)*

survive, we must stop the poverty talk and act like the growth industry we claim to be when we talk to customers, Mr. Osmanski concluded.

ATTRACTING SUPERVISORS

Going one step further, Charles M. Gardner, safety inspector, Mather Collieries, Mather, Pa., took up the problem of what can be done to encourage mine personnel to become supervisors. Admitting that it was difficult for him to conceive why there should be a shortage of qualified supervisors, if only in view of the 40% differential between a supervisor's salary and day wages, Mr. Gardner reported that he had to change his mind as he studied the problem more deeply.

Some contributing factors tending to aggravate the supervisory problem are (1) many young men of supervisory calibre have gone into other industries, (2) older supervisors retire because of age or disability, (3) additional supervisors are required because of changes in methods of working and (4) young men presently employed in the mines show a lack of interest in becoming supervisors.

On top of these are complicating factors, such as, compulsory retirement rules, seniority rules that remove younger men first when the working force must be reduced. As to why young men lack interest in supervisory work, Mr. Gardner pointed out that there may be a lack of security in supervision since failure in a supervisory position carries with it the loss of company-sponsored insurance and pensions. Furthermore, accepting a supervisory position entails the loss of benefits provided by the Welfare Fund, which includes a favorable hospital and medical setup. And a loss of seniority is involved in any moveup.

Solving these difficulties requires a serious, sincere approach to problems of seniority, supervisory benefits and training and encouragement of present young supervisors to convince them of their importance in management.

COMMUNICATIONS

Continuing on the theme of coal's personnel matters, Thomas King, safety inspector, Emerald mine, Emerald Coal & Coke Co., Clarksville, Pa., suggested the use of memo pads for mine supervisors in which the complaints of workers may be entered, in presenting his views on how to improve communications between management and labor on the local level. If the facts in the case are entered in the memo, they are nailed down, thus preventing any later misconstruction. Mr. King suggested that the memo could be made in triplicate, one copy of which could be given the worker.

In all matters, safety and others, the immediate foreman should be approached first by the men, in accordance with the provisions of the contract. If he cannot satisfy or handle the complaint, only then should it be taken higher.

(Continued on p 170)

THESE '57 CHEVIES TURNED THE TOUGH ALCAN HIGHWAY INTO A TURNPIKE!

They took the "teeth" out of North America's toughest truck run in an amazing display of stamina and dependability! The Chevrolet Alcan test called for great truck components . . . and here they are, the same modern features you'll get in *your* '57 Chevy!

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Safe, sure brakes now Alcan proved—in medium-duty models, Hydrovac power brakes* supply up to 85% of the braking effort! Powerful Air-Hydraulic brakes* gave peak stopping power in heavy-duty models!

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Rugged Synchro-Mesh manual transmissions—they displayed never-say-die durability . . . came through with smooth, flexible, trouble-free performance!

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PROVED ON THE ALCAN HIGHWAY . . . CHAMPS OF EVERY WEIGHT CLASS! CHEVROLET

Financial Aid to Higher Education

A Fine Start, But...

This editorial has two purposes. The first is to salute American business for the fine start it has made in helping to relieve the financial plight of our colleges and universities. The second purpose is to stress the importance of having business provide more financial aid, and soon.

How Business Helps Higher Education

Business contributions to higher education doubled between 1950 and 1955. They jumped from $40 million to $80 million. Preliminary figures indicate they will be even higher this year.

Business firms have also shown a lot of ingenuity in devising different ways of making their contributions. The methods range from a matching of an employee's contribution to his particular alma mater to wide diffusion of the money through state and regional money-raising associations of colleges and universities. Thanks to this ingenuity, business firms now have a wide choice of ways by which to give effective aid. The way most appreciated by college administrators is the making of gifts unrestricted as to the purpose for which the money is used.

Imposing as it is, however, what business has done thus far is only a good start. Only a tiny fraction of the total number of business firms in the country are giving direct financial help to our colleges and universities; and this fraction includes fewer than half of the hundred largest corporations in the country. Also, the amount of financial help being provided by business constitutes only a very small fraction of what is needed.

Why Colleges Need More Aid

Right now our privately endowed colleges and universities need about $350 million more in operating income a year than they are receiving to enable them to pay decent faculty salaries and be in tolerably good working order otherwise. The reasons, including a severe decline in the purchasing power of their endowment income because of price inflation, have been dealt with in the previous editorials in this series.

In addition, these institutions, together with the tax-supported schools, are faced with a tremendous increase in enrollment over the years ahead. With both a rapidly increasing population of young people and an increasing propor-

tion of them going to college, this year's enrollment of 3.2 million students is expected to reach 4.0 million by 1960, and to be doubled by 1970.

For the next ten years our privately supported colleges and universities must have an average of about $400 million a year above what they can be expected to collect from tuition fees, income from endowment funds, etc.

This figure of $400 million does not include what is needed for new buildings and equipment. It also does not include help for tax-supported schools above what they get from taxes, fees, etc. Business has given and will continue to give these schools substantial aid. Indeed, almost 25% of the financial help from business for our colleges and universities went to tax-supported schools in 1955.

If aid from business met their needs for increased operating income, the privately supported colleges and universities would be given a decisive lift in performing successfully their part in our system of higher education. They would still have large needs of capital equipment — buildings, dormitories, laboratories — but help from other sources, such as that provided by devoted alumni, where they are well organized, could be expected to go far toward meeting these needs. Also some companies prefer to concentrate on meeting needs of this type.

What 1% of Profits Would Do

But do business firms have the capacity to fill the gap in adequate operating income for our privately endowed colleges and universities without putting an excessive financial burden on themselves? Those who have studied this capacity carefully say that the answer clearly is yes. If, of its profits before taxes — this year an estimated $43 billion — business were to devote 1% to helping our privately endowed colleges, it would take care of present operating needs of about $350 million a year. And the balance of $80 million would be a big step in meeting their needs for new buildings and equipment, too.

About one half of a 1% contribution of this sort would, in effect, be made by the federal government. Up to a limit of 5%, contributions of this type are exempt from the federal corporate income tax. For corporations with incomes above $25,000 per year this tax is 52%.

It is clear that not all business firms are in shape to devote 1% of their profits to aid to higher education. Even in this year of record-breaking prosperity, many of them will have no profits at all. But if business generally would take 1% of pre-tax profits as a target or benchmark for financial help to our privately endowed colleges and universities these institutions would again have sturdy financial foundations.

Relatively this is a very small price to pay (1) to insure a continuing supply of competently trained young men and women and (2) to buttress our freedom by assuring the successful survival of the privately supported sector of our system of higher education.

This is one of a series of editorials prepared by the McGraw-Hill Department of Economics to help increase public knowledge and understanding of important nationwide developments of particular concern to the business and professional community served by our industrial and technical publications.

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Donald C. McGraw

PRESIDENT

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Industry Meeting *(Continued)*

Pilfering of mine supplies can be costly. Management may proceed to eliminate this by displaying small items on the property with a price tag attached to each, Mr. King suggested. This also is a form of good communications which may solve a troublesome problem.

TRAINING MECHANICS

Final feature of the afternoon program was presented by M. E. Altimus Jr., training supervisor, Frick District, U. S. Steel Corp., Uniontown, Pa., on the subject of developing mine workers for future mechanical mining. Noting that in the past it was possible to fill maintenance and machine operating positions by selection from the ranks or by recruitment from other mines, Mr. Altimus said that now coal companies must give thought to full development of men for the specific jobs. This requires that training goals be set up that will offer the best chance of promoting development of the attitudes and aptitudes needed by maintenance men and operators.

One of the great stimulants which insures the acceptance of training opportunities by mine personnel, regardless of their job, is a display of interest and appreciation from top management. This helps instill the necessary group participation, and the training program receives respect from those taking part in the training.

Other factors directly influencing training success are careful planning of the course and adequate attention to training quarters. Good training quarters eliminate many instructional problems and become a center for the exchange of vocational ideas.

With all due respect to the training activities of the mining industry, much remains to be done, Mr. Altimus said. Regardless of the training we do today, it will not be sufficient for tomorrow. It should be considered as a foundation for the supplementary training that will be needed in the future.

EFFECTIVE INSPECTION

Mine inspection for the benefit of men and management, importance of proper attitudes and fire-fighting equipment in modern mines were main topics at the Friday morning session, which was presided over by D. C. Jones, first vice president-elect of CMIA. Panel members in the discussion on mine inspection were James Westfield, assistant director, health and safety div., U. S. Bureau of Mines, Washington, D. C.; Lester D. Kimmel, mine inspector, Pennsylvania Department of Mines and Mineral Industries, Indiana, Pa., and J. D. Reilly, vice president—operations, Hanna Coal Co., Cadiz, Ohio. W. E. Hess, manager of coal mines, Jones & Laughlin Steel Corp., California, Pa., was moderator.

Leading off in the panel presentation, Mr. Westfield listed some of the advantages of mine inspections as leading to research into problems turned up during the inspections. Good examples of the results of such research are flame-resistant trailing cables and conveyor belts, wet rockdusting, control of methane liberation during continuous mining and work on nonflammable hydraulic fluids. These are beneficial to both men and management.

After relating some of the history of development of mining laws and the federal inspection program, Mr. Westfield pointed out recent changes in the Bureau's procedures, initiated by M. J. Ankeny, director, including publication in the federal register of all interpretations of the Federal Coal Mine Safety Act.

Citing statistics of coal's past, Mr. Kimmel noted that in Pennsylvania in 1903 a shocking total of 402 men were killed in mining 100,000,000 tons of bituminous coal. the first year this level of production was reached. In 1907, 806 men were killed in Pennsylvania bituminous mines, 239 of whom lost their lives in an explosion.

Mine inspection is not entirely the duty and responsibility of the mine inspector, Mr. Kimmel said, in explaining that greater benefits could be derived by men and management if all persons engaged in coal mining gave more attention to inspections. The prime duty of the mine inspector is to enforce the law, but he must also be progressive enough to recognize when the law is in

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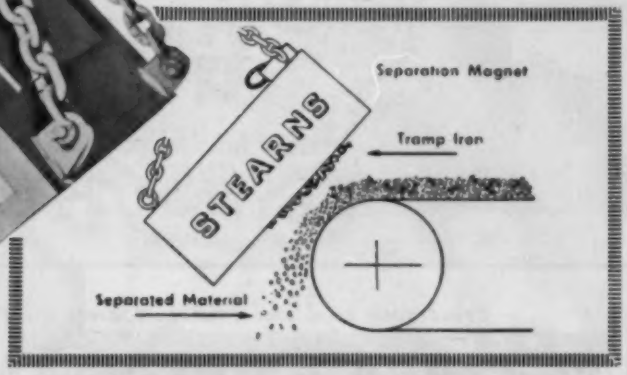

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Industry Meeting *(Continued)*

conflict with safe increases in efficiency. He should then support the needed amendments.

Mr. Reilly pointed out that we will make our greatest advance in safe operation of coal mines when everyone—miners, management and inspection departments—are in essence all mine inspectors, in whatever capacity they find themselves.

Speaking on the qualifications inspectors should have, Mr. Reilly particularly stressed technical knowledge, dependability, integrity, keen judgment, discernment and an ability to make decisions without allowing personalities to color those decisions. These characteristics make an inspector who has the respect and cooperation of the men who manage the mines as well as that of the workers. When an inspector is assigned new mines or moves into a new district he should study the recommendations that have been made by his predecessors. Finally, good inspectors are possessed of equanimity, a quality which keeps a man in possession of himself.

EXPLORING ATTITUDES

It is important, from the standpoints of safety and productivity, that the coal industry recognize the importance of employee attitudes. We must constantly seek to discover the particular combinations of physical, mental and emotional characteristics possessed by those who enjoy their tasks and who succeed at different types of work, and we must seek similar combinations of characteristics in each candidate for work. This was the theme of C. G. Evans, personnel manager, North American Coal Corp., Cleveland, Ohio, in his presentation on the importance of proper attitudes.

Taking note of the fact that forecasters see a tremendous demand for coal in 1975, say, Mr. Evans wondered where the people are coming from to mine this "astronomical" tonnage. Some are thinking in terms of complex machinery for doing the job, but this must be followed by a sudden realization that highly skilled people will be needed to operate and repair the equipment and to direct the work.

Behavior has its origin in the attitude patterns of the individual, Mr. Evans explained, in pointing out that these attitudes are shaped by learning from parents, friends and the primary groups of which the individual is a member. Later these attitudes jell into opinions.

An evaluation of the attitudes of employees is of prime importance for the following reasons:

1. The process of a worker unburdening himself is, in itself, a wholesome experience. Impulses can be talked out instead of acted out.
2. Management can anticipate troubles before they become acute.
3. The experience of interviewing is valuable training for foremen or prospective supervisors.

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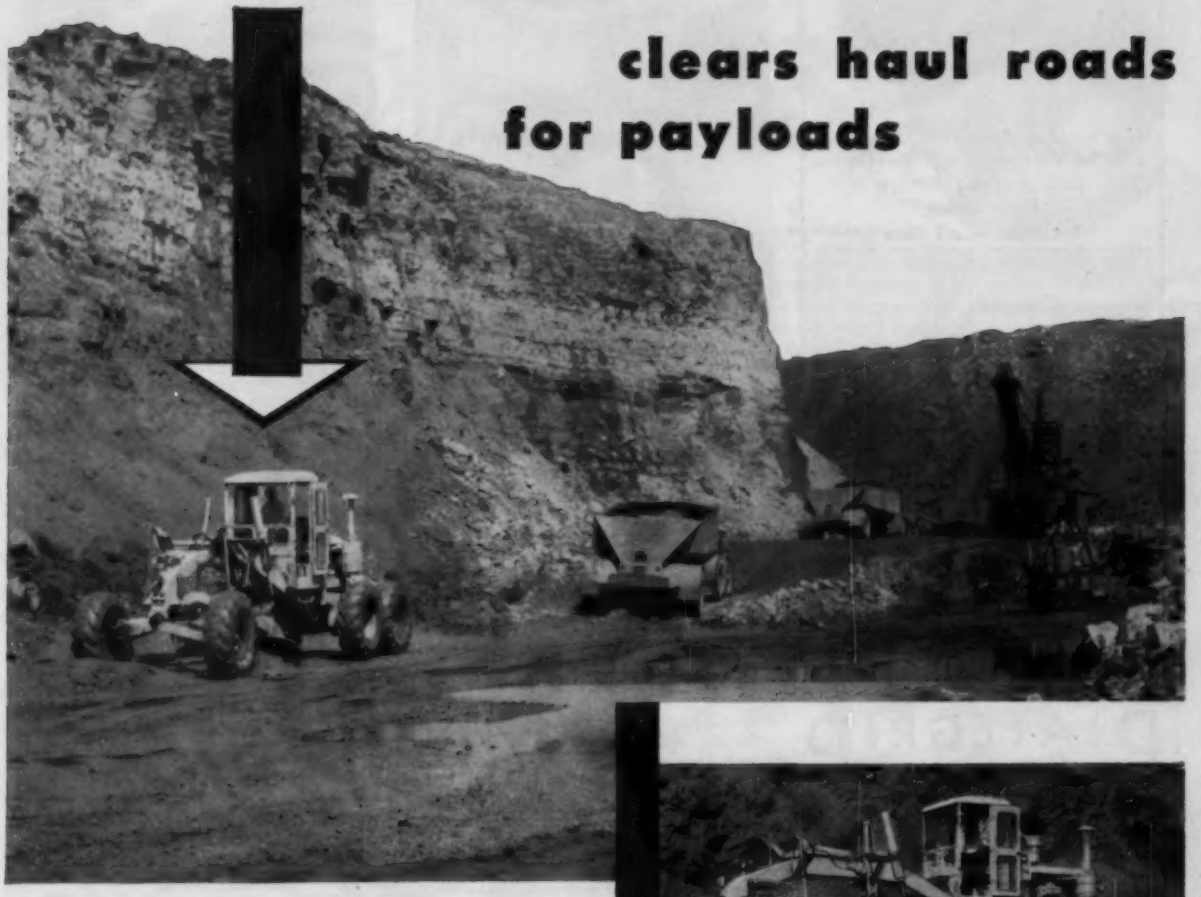

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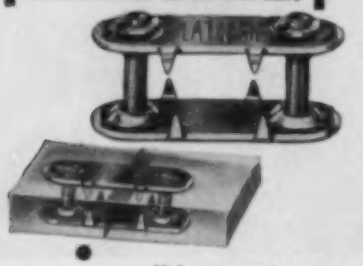

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Industry Meeting *(Continued)*

C. W. PARISI, director of safety, Pittsburgh Coal Co., describes underground fire control and equipment.

SAFETY PROMOTION—J. M. Lowe, secretary, CMIA, and George P. Resick, Pa. Dept. of Mines.

fire-prevention discipline and good equipment and methods for fighting a fire in the event one should occur. On top of this is a need for full training of personnel in the use of the available fire-fighting equipment. These are the fundamentals explained by C. William Parisi, director of safety, Pittsburgh Coal Co., Library, Pa., in his description of fire-control systems at three Pennsylvania bituminous mines.

Water still is the most effective extinguishing agent for underground fires, but certain precautions must be observed if a water-distribution system is to be effective at the time of an emergency. In the first place, long pipelines must be of sufficient diameter to counteract line losses in order that sufficient quantity at the proper pressure be available at the point of discharge.

A highlight of Mr. Parisi's paper was his description of new fire cars soon to be delivered to his company's mines. Each car will have a capacity of 2,200 gallons and will be equipped with a centrifugal pump to deliver 100 gpm at 120 psi at the end of 600 ft of 2-in hose. Hose, nozzles and tools will be included in the supplies on the car. The new cars will supplement the installed fire-fighting system.

CONTINUOUS MINING

Assuming an operator's responsibility to get the most out of a new machine, John A. Stachura, general superintendent, Enoco Collieries, Inc., Bruceville, Ind., recounted experiences in modifying three Colmols purchased by his company in cooperation with Jeffrey Mfg. Co., Kennametal, Inc., and Cincinnati Mine Machinery Co. Important changes and results are as follows:

1. The pilot was changed from a 3-bit unit to a 4-bit unit, eliminating the problems of packing with fine coal and excessive friction.

2. Stronger steel was used in rotating arms to eliminate excessive breakage.

3. Length of the cutting shafts was modified to provide three planes of cutting thus raising efficiency.

4. Loss of bit holders and downtime resulting therefrom was practically eliminated by designing a tapered shank for bits and by welding brackets to arms.

5. Excessive oil leakage through the front cover plates of top and bottom heads was eliminated by the use of longer and larger cover-plate bolts.

6. Replacement of original timing gears with new and larger timing gears reduced the number of changes required and the cost of replacements and labor charges.

7. New retainers on the head-drive hydraulic motors eliminated a source of trouble.

8. The dozer blade was strengthened.

9. Speed of rotation of the arms was reduced from 63 rpm to 45 rpm, eliminating excessive abuse from bouncing of the machine, reduced the operating temperature and helped to eliminate loosening of bolts in cover plates and elsewhere.

Martin Valeri, assistant superintendent, Buckeye Coal Co., Nemacolin, Pa., described the use of joy continuous miners in recovering pillars in the Pittsburgh seam. Briefly stated, Mr. Valeri pointed out that a more consistent level of productivity is obtained from continuous units as compared with conventional units in the same mine. Figures for 1956 show that tons per man on continuous crews is 55% greater than that of conventional units. The full text of Mr. Valeri's paper is to appear in an early issue of *Coal Age*.

In the final paper of the 1956 meeting, James T. Jones, assistant superintendent, Mather Collieries, Mather, Pa., described methods and productivity using Lee-Norse miners.

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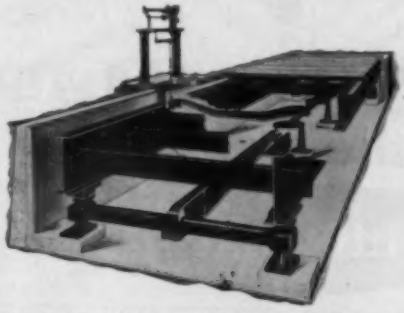

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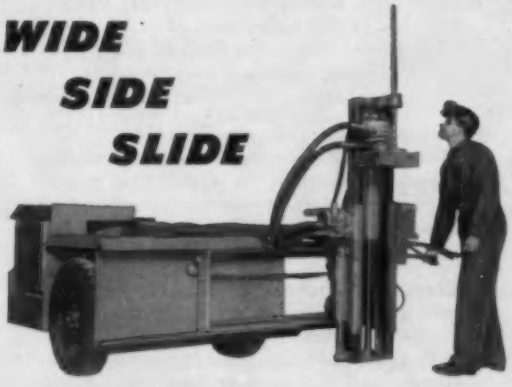
Scale Manufacturers since 1896 **Phone: North 6515**

WIDE SIDE SLIDE



FLETCHER Roof Control Drills — with Hydro-slide — make bolting easier and faster than ever. On 4-foot centers, without moving the machine, you can install 3 bolts across with the 8½-foot slide, 4 bolts across with the 12½-foot slide. A telescoping arrangement keeps overall machine width to less than 7½ feet on all models. This rugged slide system will reduce working-place moves by 80% . . . increase bolting capacity by 10 to 40%.

See the heavy duty, high capacity FLETCHER Drills — built in a size and style to fit your mine and your working conditions. Write for information NOW.

Fletcher ROOF CONTROL DRILLS

J. H. FLETCHER & CO.

P.O. Box 353 — Phone 44186
HUNTINGTON 8, W. VA.

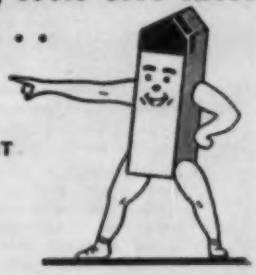
SUPERSET CORE BITS

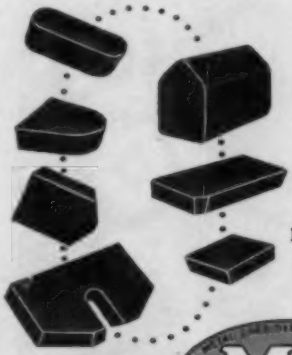
● Mining contractors, ore prospectors, coal operators and construction firms are realizing tremendous savings by taking advantage of our **exclusive fabrication service!** Contractors send us the necessary diamond stones from their own stocks—we hand set them in a super-hard tungsten carbide crown and braze to the threaded steel blank. Hand-set bits assure the proper positioning of each diamond stone to achieve maximum cutting efficiency. The carbide matrix holds the diamond stones until entirely used up. These advantages mean lower drilling costs to you. We can also supply complete core bits or salvage the stones from used bits at nominal cost. Supplied in standard sizes EX, EXE, AX, BX, NX, etc.

Metal Carbides Corporation
Youngstown 7, Ohio

Talide Tips for Mining Tools Give These 3 BIG ADVANTAGES . . .

1. EXTRA STRONG
2. SUPER HARD
3. SHOCK RESISTANT





● A complete line of low-cost, high-quality Talide Tips is offered fabricators and users for tipping machine bits, rock bits, drill bits, roof bits and open-pit bits. All Talide Tips have a special surface finish that facilitates brazing. Non-standard shapes and sizes quoted on request.

TALIDE
YOUNGSTOWN 7, OHIO
SINTERED CARBIDES - HOT PRESSED CARBIDES
HEAVY METAL - CERMETS - HIGH TEMPERATURE ALLOYS
OVER 25 YEARS' EXPERIENCE IN TUNGSTEN CARBIDE METALLURGY

Cut Roof Bolting Costs!

with Dependable

PALNUT®

SHELL SUPPORTS

PALNUTS hold in softer types of strata where other shell supporting methods are often inadequate. Cuts costs by eliminating re-installation of bolts caused by shell support failure.

PALNUTS cost less than ½ as much as forged ears. Are easy and fast to assemble—offer worthwhile savings over other shell supports when plain bolt, PALNUT and standard type shell are assembled underground.

PALNUTS are also widely used on reclaimed bolts.

You can buy roof bolts with PALNUTS pre-assembled or buy PALNUTS separately from your jobber.

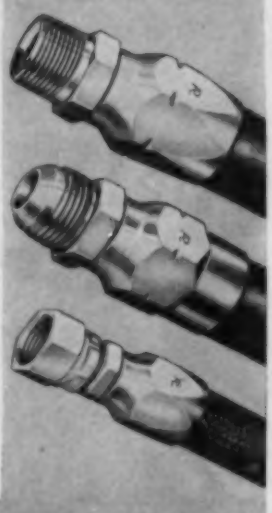
THE PALNUT CO. 31 Glen Road, Mountainside, N. J.

Subsidiary of United-Carr Fastener Corporation

New Parker Hoze-lok fittings make up easier, are re-usable

- Longer, trouble-free service. Because of unusually large gripping area, *Hoze-lok* won't pull out.
- Socket thread is larger than braid diameter, making it easier to insert hose end into socket. Socket contour provides greater wrench clearance at hex of nipple.
- Greater re-usability. You don't need big inventories.
- Conform both to S.A.E. Hydraulic Hose and Fitting Standard and to J.I.C. Hydraulic Standards.
- 3 styles available for medium and high-pressure service.
- Full details in Parker Catalog No. 4400.

Parker



Order From Your Parker Distributor — or Tube and Hose Fittings Division, Section 418-E, The Parker Appliance Co., 17325 Euclid Ave., Cleveland 12, Ohio.

How to keep informed on the "with what" part of your business

AT YOUR FINGER TIPS, issue after issue, is one of your richest veins of job information — advertising. You might call it the "with what" type — which dovetails the "how" of the editorial pages. Easy to read, talking your language, geared specifically to the betterment of your business, this is the kind of practical data which may well help you do a job quicker, better — save your company money.

Each advertiser is obviously doing his level best to give you helpful information. By showing, through the advertising pages, how his product or service can benefit *you* and *your* company, he is taking *his* most efficient way toward a sale.

Add up all the advertisers and you've got a gold mine of current, on-the-job information. Yours for the reading are a wealth of data and facts on the very latest in products, services, tools . . . product developments, materials, processes, methods.

You, too, have a big stake in the advertising pages. Read them regularly, carefully to keep job-informed on the "with what" part of your business.

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Consulting Mining Engineer
Coal Property Prospecting
Development, Operation and
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42 Years' Service to the
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Phone EXpress 1-3869

GEO. S. BATON & COMPANY
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Cost Analysis — Valuations
Mine and Preparation Plant Designs
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EAVENSON, AUCHMUTY & SUMMERS
Mining Engineers
COAL OPERATION CONSULTANTS
VALUATIONS
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Drill Contractors Since 1902
Specialists in exploratory—grout hole and pressure grouting. Rigs located in over 50 strategic areas for prompt service. Free estimates.
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Industrial Engineering Programs Established
Methods Analysis—Foremen Training—Cost Control
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Ralph E. Kirk — Percy G. Cowin
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Oliver Building — Pittsburgh, Pa.

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PAUL WEIR COMPANY
Mining Engineers and Geologists
Consultants and Managers
DESIGN and CONSTRUCTION
20 North Wacker Drive — Chicago 6, Illinois

Replies (Box No.): Address to office nearest you c/o This publication Classified Adv. Div.
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CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

SEARCHLIGHT SECTION

(Classified Advertising)

EMPLOYMENT: BUSINESS: **"OPPORTUNITIES"** EQUIPMENT: USED OR RESALE

POSITIONS VACANT

Engineer to fill vacancy in Engineering Dept. of large coal mining operation. Must be qualified for underground and surface surveying, mapping and general drafting work. Apply: Inland Steel Company, Wheelwright, Kentucky.

Wanted: Civil or Mining Engineer—Experience Coal Mining—to fill position of Assistant Chief Engineer. Age 30 to 45. College graduate. Location, Kanawha District. Modern house available in mining town. Paved roads and near Charleston, W. Va. Please state qualifications. P-3757, Coal Age.

BUSINESS OPPORTUNITY

STRIP COAL WANTED
Lease or purchase—large or small tracts. Morgan Coal Company, 2850 North Meridian Street, Indianapolis 8, Indiana.

WANTED

Anything within reason that is wanted in the field served by Coal Age can be quickly located through bringing it to the attention of thousands of men whose interest is assured because this is the business paper they read.

STRIPPER

A deep mine coal operator with large holdings desires contact with experienced strip mining organization. Must have equipment suitable for production of large tonnage in hilly terrain.

BO-3621 Coal Age
Class. Adv. Div., P.O. Box 12, N.Y. 36, N.Y.

Erie Mining Company, in northern Minnesota where there is excellent hunting and fishing, is considering applications for a permanent position as Supervisor of Maintenance for Heavy Duty Equipment.

Applicant should have ME Degree or equivalent with at least five years' of supervisory experience in a responsible position covering the repairing or rebuilding of diesel and electric shovels, large trucks to 35 cubic yards, tractors, and smaller units.

Excellent housing, schools, and churches. Insurance and pension benefits.

Send complete resume and salary desired to:

Industrial Relations Dept.
Erie Mining Company
Box 847, Hoyt Lakes, Minnesota

2 TELEPHONES $22.75

Inter-communication handsets, two wire system. Included Two 6 volt batteries, 50 ft. of wire and simple wiring instructions. Additional wire 1 cent per ft. or $25.00 per mile. Complete list of telephone parts, handsets, magneto—common battery — and dial telephones, switchboards, etc. All shipments FOB Simpson, Penna.

Telephone Engineering Co., Dept. 12CA7, Simpson, Pa.

Proven COST REDUCTION PROGRAMS
for the Coal Industry
HELMICK & ASSOCIATES
9619 LAKE SHORE BLVD. — CLEVELAND, OHIO

MOTORS • GENERATORS
TRANSFORMERS
NEW • REBUILT
WORLD'S LARGEST INVENTORY
ELECTRIC EQUIPMENT CO.
Phone Station Collect GL 3-6781
P. O. Box 51 Rochester, New York

Manitowoc 4500 Dragline 5 yd. Excellent.
Page 621 Dragline 10 yd. good as New.
Manitowoc 3500 High F. Shovel, very good.
Joy Continuous Miner 3 JCM—2CE late type.
Al.-Ch. 300 KW-MG Set & Controls & 100 KW.
Vulcan Hoist 600 HP & Lge Drum reels 11000' of 1¼" Rope & Controls
Joy 10 BV Cutter AC 220 V. & 12 BU-AC 220.
Taylor 3 F-2 Deck Screen 6' x 16' & 42 E Shuttle Cars
T. L. SIMPSON, MACHY. AGENT
1200 Woodbourne Ave., Pittsburgh 26, Pa., LE 1-2254

New and Used Mining Equipment
Crushers, feeders, conveyors, tipples, locomotives, mining machines & fans.
The Industrial Machine & Electric Company
T. E. Davies, Owner
Phone 5764
PO Box 1107, Morgantown, W. Va.

MINING EQUIPMENT FOR SALE

TRACKLESS EQUIPMENT

(W) 2—32E10 Jay shuttle cars rebuilt
(C) 1—32E7 Jay Shuttle Car
(C&W) 4—32D Jay Shuttle cars
(C) 1—Lee Norse Shuttle Car
(W) 1—T2 Jay Cat Truck
(C&W) 4—12BU 9E Jay Loaders
(C) 1—8BU 250 Volt DC
(W) 1—8BU, 250 Volt DC
(W) 1—8BU 11G, 220/440 V. AC
(W) 1—Baker Battery supply Tractors, Permissible
(C) 1—1224 Goodman Cutter, Rubber Mtd.
(C) 1—29U Jeffrey, Rubber Mtd.
(C) 1—PLII-5E Jay Elevator
(C) 1—PLII-7E Jay Elevator
(C) 2—PLII-8E Jay Elevators
(W) 4—40 H.P. Acme Self Propelled Air compressor—permissible
(C) 1—8BU 500 V. DC

CONVEYORS

(C) 1—MTB 30" Jay Belt Conveyors 1000 Centers
(W) 1—25 H.P. MTB Belt drive
(W) 1—MTB 26" Jay Belt Conveyor 570'
(W) 2—85A 24" Goodman Conveyors approximately 500'
(C) 1—MTB 26" Jay Conveyor, 1000' Centers less belt
(C&W) 8—61AM Jeffrey Room Chain Conveyors
(W) 7—61MG Jeffrey Face Chain Conveyors
(W) 3—61EW Jeffrey Elevating chain conveyors
(C&W) 4—61W Jeffrey 15" Gathering Chain conveyors
(W) 4—15" Jay Chain Conveyors, permissible
(C) 2—20" Jay Chain Conveyors
(W) 6—G15 Goodman Shaker Conveyors
(C&W) 6—G12½ Goodman Shakers AC&DC
(W) 1—PT12 Long Piggyback conveyors
(W) 32—Goodman Power Duckbills, Model 477, G11½

CUTTING MACHINES

(W) 4—7B Sullivans
(C&W) 4—7AU Track Mtd. Sullivans
(W) 6—11B Sullivans, Both 35 & 50 H.P.
(W) 1—29C Jeffrey Arc Wall
(C) 1—29U Jeffrey 220/440 Volt, 42" t.g. Excellent
(C) 1—33L Jeffrey
(C&W) 15—35B & 35BS Jeffreys, as is or rebuilt
(C&W) 6—12AB Standard Goodmans 35 H.P.
(W) 4—12AA Standard Goodmans, 50 H.P.
(W) 2—212AA Baby Goodmans
(W) 1—312 G3, 220/440 V. AC Goodman Rebuilt
(C) 2—412 CA Goodmans
(W) 4—512 DA Goodmans
(C) 2—712 Goodmans
(C) 1—824 Goodman, 42" t.g.
(C) 1—1224 Goodman, Rubber mtd.
(C) 1—Lot Machine Trucks for Jeffrey & Goodman

LOCOMOTIVES

(W) 1—4 ton Ironton, 42" t.g., completely rebuilt, 23" high
(C) 1—MH12 Jeffrey
(C) 1—MH96 Jeffrey
(W) 3—MH86 Jeffreys
(W) 1—MH150 Jeffrey, 42" t.g. 25" high
(C) 1—MH110, 42" t.g.
(C&W) 4—MH100 Jeffreys, 36" t.g.
(W) 5—HM803 GE 36", 42", or 44" t.g.
(W) 3—HM825 GE 42" t.g.
(W) 1—8-30 Goodman, 4 ton, 25" high, 36 t.g.
(C&W) 3—8314T, Goodmans, 6 ton
(W) 1—6 ton Goodman
(C&W) 3—204 West, 6 ton Locomotive
(C&W) 1—6 ton, GE, Battery Locomotive with batteries—all new

MINE CARS

(W) 200—42" t.g., 28" high, end dump
(W) 16—42" t.g. End dump, 19" high
(W) 50—36" t.g. ACF Drop Bottoms, Cheap
(W) 13—36" t.g. Ranford Day, Drop Bottoms
(C) 14—42" t.g. End dump, wood
(W) 50—44" t.g. End dump, 3 ton, all steel, excellent
(W) 75—44" t.g. End dump, 2½ ton composite cars—enterprise
(W) 65—44" t.g. End Dump, 2 ton, enterprise, composite
(W) 100—44" t.g. E. D., 1½ ton, 23" high Composite

SUBSTATIONS

(C) 1—100 KW, GE motor generator set
(W) 1—200 KW West, Rotary, 1200 RPM, 2300/4000 V. AC, 275 DC, automatic breakers
(C) 1—200 KW HCCG, G.E. Rotary, 2300/4000 V., 275 DC
(W) 1—150 KW West, MG Set, 1200 RPM, 2200 volt, 275 DC
(W) 1—150 KW GE MG Set, 1200 RPM, 2200 volt, 275 DC
(C) 1—130 KW West, MG Set, 200 volt
(W) 1—150 KW Rotary 2300/4000 completely automatic

(W) 5000'—30" Goodyear Coal flow Raybestos Manhattan Homocord Belt—@ $3.25 per ft.

MISCELLANEOUS

(C&W) 8—HKL Brown Fayro Car Spotting Hoist
(C) 1—Nolan Automatic Car Spotter
(C&W) 12—Hoist, 5 to 100 H.P.
(C) 1—HKM Brown Fayro Car Spotting Hoist
(C) 1—25 h. p. Doub'e drum hoist
(C) 1—15 h.p. Car Spotting Hoist, 220/440 volt
(W) 3—Sets Mine tract scales (W) 2—Crossover Dumps—New & Used
(C&W) 16—Coal Drills A7, 56A, 471 & 572, AC & DC
(W) 1—Armco Prefab Steel Building—130' long
(W) 1—9' Morrow Shaker
(C) 1—42" Loading Boom, 52' Long
(C) 1—48" Loading Boom
(W) 1—Lot 18" Belt Conveyor for 30' to 150'
(W) 1—40" Morrow Scraper Conveyor 250' Long
(C) 1—D4 Caterpillar Dozer
(C) 1—42" x 36" Jeffrey Flexiseth Crusher
(W) 1—MSA Bantam Duster
(C) 2—American Mine Door Rock Dusters
(C) 1—30 H.P. MSA Rock Duster Permissible
(C) 1—5' x 10' Double Deck Screen
(C) 1—6' Aerodyne Fan
(C) 1—210 Cu. ft. Schramm Air compressor
(C) 1—105' cu. ft. Acme Air compressor—tract mtd.
(C) 1—Winslow Truck scales
(C) 2—Hoyle Truck Scales
(C) 2—ITE Automatic Circuit Breakers
(C&W) 6—24J & 38J Jay Motors for locomotives or shuttle cars
(C&W) 3—Battery chargers
(C&W) 10—Pumps, all types

We are interested in purchasing any and all types of mining equipment and especially late type machinery.

ELECTRIC & MACHINE SUPPLY COMPANY

MINING & INDUSTRIAL EQUIPMENT

Whitesburg, Kentucky
P.O. Box 610—Phone 2590 or 2594
*(W) Denotes equipment located at Whitesburg, Kentucky
BILL CONLEY

MELVIN ADAMS

Clarksburg, West Virginia
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(C) Denotes equipment located at Clarksburg, West Va.
H. J. (HANK) UBBING

Please Direct Your Inquiries to Proper Location for Prompt Quotation — ALL INQUIRIES APPRECIATED

FOR SALE • • *7000 ACRES OF COAL LANDS*

7,000 acres of coal lands located in Franklin County, Illinois. Property also includes some buildings and equipment.

Direct access to the Chicago and St. Louis markets is provided through facilities of the Illinois Central and Chicago and Eastern Illinois Railroads.

There is an estimated 49 million tons here with 56 per cent recovery. The mining seam averages 7 feet. The mine is capable of handling an output of 5,000 tons per day.

Information concerning these properties is available from a report made by Allen and Garcia, Consulting Engineers. Property is being sold by the Trustees for the bondholders.

For further information • • Write or call:

• Ira E. Westbrook • Charles H. Watson • Moses Pulverman

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FOR SALE

BRAND NEW—1201 LIMA DRAGLINE

85' Boom, 3 yd. Bucket
Used One Week
Job went sour—Owner will take substantial loss

FRANK SWABB EQUIPMENT CO., INC.

313 Hazleton Nat'l. Bank Bldg.
Hazleton, Pa.
GLadstone 5-3658

SAVE ON ELECTRIC WIRE and CABLE

Available from stock—For immediate delivery

Mining Machine Cable	Shovel Cable
Welding Cable	Locomotive Cable
Portable Cord	Shotfiring Wire
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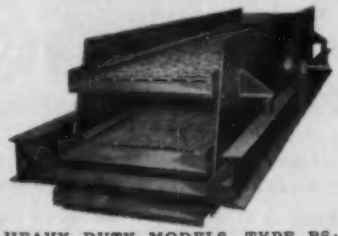
UNIVERSAL Wire and Cable
2917 North Paulina, Chicago 13, Ill.

BONDED EQUIPMENT BARGAINS

IMMEDIATE SHIPMENT FROM OUR FACTORY—WRITE, WIRE OR PHONE

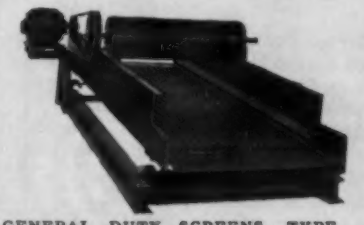
NEW BONDED® HEAVY DUTY VIBRATING SCREENS



HEAVY DUTY MODELS, TYPE BS: Four bearing positive throw eccentric shaft; 3' x 6' to 5' x 14', 1 to 5 decks. White for New 8-page Bulletin No. 1087.

Model Number	Screening Area	No. of Decks	Sale Price
124AS	2' x 4'	1	$ 443
224AS	2' x 4'	2	472
126AS	2' x 6'	1	472
226AS	2' x 6'	2	501
136AS	3' x 6'	1	581
236AS	3' x 6'	2	688
336AS	3' x 6'	3	956
138AS	3' x 8'	1	675
238AS	3' x 8'	2	815
338AS	3' x 8'	3	996
336BS	3' x 6'	3	1303
436BS	3' x 6'	4	1447
138BS	3' x 8'	1	1231
238BS	3' x 8'	2	1282
338BS	3' x 8'	3	1375
248BS	4' x 8'	2	1865
348BS	4' x 8'	3	2035
2410BS	4' x 10'	2	1953
3410BS	4' x 10'	3	2305
2412BS	4' x 12'	2	2319
3412BS	4' x 12'	3	2635
4412BS	4' x 12'	4	2933

NEW BONDED® GENERAL DUTY VIBRATING SCREENS



GENERAL DUTY SCREENS, TYPE AS: Eccentric weight mechanism, spring mounted, 1 to 3 decks, 2' x 4' to 3' x 8'. Write for New 8-page Bulletin No. 1086.

For mineral, chemical and other industrial products. Fast, efficient and economical for cleaning, sizing, grading, dewatering. Made in all metals including stainless steel. Enclosed models for hot materials or dust control. Bonded screens are built for any screening operation, wet or dry.

NEW BONDED® TROUGHING IDLER CONVEYOR BARGAINS

Complete Ready-Fab sections quickly and easily joined together on the job. We take our loss on our stock of short length belting. You can save as much as 50% on the BONDED CONVEYOR SPECIALS listed, with conveyor belting in two pieces. Conveyors are equipped with 5" roll diam. idlers and return rolls, 20" diam. head pulley and 16" diam. tail pulley mounted on 2¾ or 2-7/16" diam. shaft. Belt is new 4-ply, 28-oz. duck, ⅛" top rubber cover x 1/32" bottom cover and is fresh stock made by leading manufacturers.

CONVEYOR PRICES INCLUDE BELTING

Belt Width	Length of Conveyor	List Price	Sale Price
14"	25'	$1397	$ 722
14"	50'	2222	1144
14"	85'	3377	1733
16"	20'	1262	636
16"	45'	2137	1088
16"	60'	2662	1359
16"	90'	3712	1900
18"	25'	1477	794
18"	45'	2217	1166
18"	70'	3142	1648
18"	85'	3697	1933
18"	100'	4252	2220
18"	130'	5362	2797
20"	25'	1517	828
20"	60'	2882	1533
20"	75'	3467	1838
20"	90'	4052	2145
24"	25'	1590	898
24"	45'	2430	1330
24"	70'	3480	1875
24"	100'	4740	2514
24"	120'	5580	2950
24"	150'	6840	3603
30"	50'	2911	1617
30"	70'	3871	2119
30"	90'	4831	2614
36"	25'	1818	1118
36"	45'	2858	1678
36"	60'	3638	2096
36"	100'	5718	3214

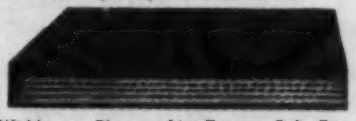
For conveyors longer or shorter than those listed above, add or deduct the following per foot prices according to belt width. Prices include belting. Write For Buelltin #1138.

For 14" belt	$16.84 per foot
For 16" belt	18.04 per foot
For 18" belt	19.24 per foot
For 20" belt	20.37 per foot
For 24" belt	21.78 per foot
For 30" belt	24.75 per foot
For 36" belt	27.95 per foot

Bonded Troughing Idler Conveyors are also available with Truss Type Construction. Write for descriptive information and prices.

NEW CONVEYOR BELTING SAVE UP TO 25%

Heavy duty 4-ply, 28 oz. duck ⅜" top rubber cover by 1/32" bottom cover 12# to 15# average friction pull; 800# to 1000# average cover tensile rubber belting having high tensile strength, tough cotton duck, strong carcass and proper flexibility. For heavy boxes, bags and bulk materials. Troughs easily. Famous brands at deep cut prices. Fresh stock.



Width	Ply	List Price	Sale Price
14"	4	$3.52	$2.83
16"	4	3.96	2.97
18"	4	4.38	3.29
20"	4	4.83	3.80
24"	4	5.68	4.26
30"	4	6.97	5.21
36"	4	8.26	6.18

A high grade of heavy duty 4 and 5-ply, 28 oz. duck, ⅛" top rubber cover x 1/32" bottom rubber cover, 16# to 19# average friction pull, 2500# to 3000# average cover tensile belting. This belt is for more severe services, high tonnages and abrasion resistance. For handling stone, mineral ores, concrete, cement, coal and other similar materials, both wet and dry. Belt has molded rubber edge.

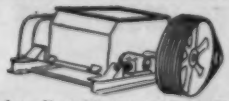
Width	Ply	List Price	Sale Price
16"	4	$4.71	$3.46
18"	4	5.23	3.83
20"	4	5.73	4.37
24"	4	6.74	4.94
30"	4	8.28	6.07
24"	5	7.90	5.78

The following belts are 5-ply, 32 oz. duck:

Width	Top Cover	Bottom Cover	List Price	Sale Price
24"	1/16"	1/16"	$8.56 foot	$6.42 foot
30"	1/16"	1/16"	10.52 foot	7.89 foot
36"	3/16"	1/16"	14.21 foot	10.66 foot

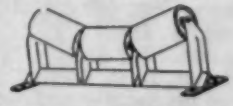
Other widths, plies, duck weights and cover thicknesses available at low prices. Write for Free Sample.

NEW BONDED® COAL CRUSHERS



Capacities from 20 to 500 tons per hour. Will crush to all sizes from sticker to 6". Take feed sizes to 24". Double and single roll models. Steel hoppers included. Priced from $527.00

NEW IDLERS AND RETURN ROLLS 28% BELOW LIST PRICE



3-roll, 5" diameter Troughing Idlers for:

14" belt	$18.50	24" belt	$21.25
16" belt	19.25	30" belt	22.00
18" belt	20.50	36" belt	22.75
20" belt	20.75	48" belt	25.50

1-roll, 5" diameter Return Idlers for:

14" belt	$7.25	24" belt	$ 8.50
16" belt	7.50	30" belt	9.50
18" belt	8.00	36" belt	10.00
20" belt	8.25	48" belt	11.50

All steel. Interchangeable with other well-known makes. Furnished with easily replaceable pre-lubricated Sealed ball bearings. Also can be furnished with greasable type Alemite Fitted bearings at slight additional cost. Maintenance is negligible. Write for bulletin #1138.

BONDED CONVEYOR ACCESSORIES

All Bonded Troughing Idler Conveyors (described in this ad) can be equipped with any accessory described below or use them on your present conveyor or bucket elevator. Write for Bulletin #1138.

Carrying Belt Guide Idler $14.50

Return Belt Guide Idler $11.75

Wing Pulley $71.50

Holdback $99.00

Self-Aligning Idler $60.75

Head & Tail $149.00

Screw Takeup and Frame $30.25

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120-B Bucyrus Erie Elec. Drag, 115', 5 yd.
5-W Bucyrus Erie Drag, 115', 5 yd.
4500 Manitowoc Drag, 120', 5 yd.
1055 P&H Drag, 90, 3½ & 4 yd.
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802 Lima Cranes
3500 Manitowoc 60 ton Crane
3500 Manitowoc Drag, 80', 2½ yd.
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1201 Lima Standard 3½ yd. Shovel
1201 Lima 2½ yd. H. L. Shovel
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820 Lorain 2 yard Shovel
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58-BH Joy Champion Rotary Air Drills
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Portadrill Truck Mounted Air Drill
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3—Joy 11-BU Loaders.
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1—Joy 5BC Shuttle Car, rebuilt.
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2—Joy 32E10 Shuttle Cars.
4—Joy 32E15 Shuttle Cars.
2—Joy 32E16 Shuttle Cars.
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4—Joy 11-B Cutting Machines, like new.
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2—Goodman 512 Machines, with Bugdusters.
4—Goodman Machines on Cars, 31" high, All hydraulic.
1—Goodman 512 Cutting Machine, perfect.
3—LaNorse low vein Machine Carriers.

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2—Jeffrey MH-2124, 15 tons.
1—Jeffrey, 15 ton, type MH-110, 36", 42" and 44" Ga.
3—Jeffrey, 10 ton, type MH-78, 42" and 48" Ga.
12—Jeffrey, 6 ton, type MH-88, 42", 44" and 48" Ga.
3—Jeffrey, 4 ton, type MH-88, 42", 44" and 48" Ga.
1—G.E. 4 ton, type 825 Locomotive, 26" high.
10—G.E. 6 ton, types 801, 803, 821 Locomotives, 42", 44" and 48" Ga.
1—G.E. 8 ton, type 822 Locomotive, 44" Ga.
3—G.E. 10 ton, type 809 Locomotives, 42", 44" and 48" Ga.
1—G.E. 10 ton, 829 Locomotive, 38" Ga.
1—Goodman 4 ton, 8-30 Locomotive, 22" above rail.
1—Goodman 6 ton Locomotive, 26" high.
2—Goodman type 33, 6 ton, 44" and 48" Ga.
3—Goodman, 8 ton, type 32A, 30", 44" and 48" Ga.
3—Westinghouse, type 902, 4 ton, 42" and 48" Ga.
2—Westinghouse type 904, 6 ton, 44" and 48" Ga.
2—Westinghouse, type 906, 44" and 48" Ga.
3—Westinghouse, type 907, 10 ton, 44" and 48" Ga.

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1—Cedar Rapids portable super Screening Plant.
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3—Goodman 512-G-3, 220 AC, Rebuilt.
1—Baby Goodman 212, rebuilt.
1—Goodman 312's, 18" high.
2—Goodman 512's with Bugdusters, like new.
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10—Goodman 524 Slabbers.
2—Goodman 724 Slabbers.
30—Jeffrey 35U's, like new, 17" high.
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2—Jeffrey 29C's, track mounted.
3—Jeffrey 29L's on track, perfect.
2—Sullivan CR-10's, 15" high.

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17—Joy Loaders, all types.
3—Jeffrey 61 CLR's on rubber, 26".
3—Jeffrey L-500 Loaders.
2—Myers Whaley No. 3 Automat Loaders.
3—Clarkson Loaders, 26" above rail.

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2—Joy 30" Belt Conveyors, 10 to 15 H.P.
3000' 30" Conveyor Belt.
6—Jeffrey 61AM Room Conveyors, 300 ft.
10—Jeffrey 61HG Face Conveyors.
2—61EW Elevating Conveyors.
2—61WH 15" Room Conveyors, 300 ft.
4—Joy Ladel UN-17 Shakers.
10—Goodman G-12½ and G-15 Shakers.

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1—150KW, G. E. HCC-6's, 275 v.d., Rotary Converter.
1—200 KW, G. E. HCC-6 Rotary Converter, 275 volt, DC.
3—300KW, G. E. HCC-6 Rotary Converters, 275 DC.
1—200KW, Westinghouse Rotary Converter, 275 DC. (All the above with 6900/13800 and/or 2300/4000 primary transformers.)
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1—22 HP Vulcan, double drum
1—25 HP Vulcan, single drum
1—30 HP Vulcan, single drum
1—37 HP single drum
5—50 HP single drum
2—60 HP single drum
1—75 HP Vulcan Double Drum
3—100 HP Box single drum
1—112 HP Vulcan, single drum
1—150 HP Vulcan, single drum
2—125-200 HP Ottumwa single drum
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3—3½-4 ton Mancha, 24" ga.
1—4 ton Westinghouse, 24" ga.
1—4 ton Ironton, 36" ga.
2—6 ton General Electric, 36" ga.
2—7 ton General Electric, 36" ga.
1—7 ton Atlas—36" ga.
5—8 ton Ironton, 36" ga.
2—8 ton General Electric, 36" ga.
2—8 ton Goodman, 36" ga.
4—10 ton Atlas, 36" ga.

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2—10 T. Jeffrey, 42" ga.
1—13 T. Goodman, 42" ga.
1—13 T. Jeffrey, 42" ga.
1—15 T. Jeffrey, 42" ga.

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7—Joy model 6OD1, battery operated

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FAIRMONT

WORKS FOR COAL'S FUTURE!

FAIRMONT MACHINERY IS BUSTLING WITH ACTIVITY AS IT KEEPS PACE WITH AMERICA'S EXPANDING COAL INDUSTRY--AN INDUSTRY WELL ON ITS WAY TO NEW HIGHS IN TONNAGE PRODUCED

FAIRMONT-designed,

FAIRMONT-constructed Preparation Plants

are very much in evidence over the country's coal fields . . . modern coal cleaning plants which are steadily pouring out the clean, well-sized coal so necessary to American progress.

Qualified by 60 Years of Experience

FAIRMONT

MACHINERY COMPANY

FAIRMONT, WEST VIRGINIA

DESIGNERS AND CONSTRUCTORS OF COMPLETE COAL PREPARATION PLANTS USING BOTH WET AND DRY CLEANING, CENTRIFUGAL AND THERMAL DRYING.

TOUGH MACHINE FOR A TOUGH JOB

Maneuverability around the shovel—plus power aplenty for high travel speed loaded—are two of many reasons why the DW21-PR21 delivers high production. The PR21 has a rated capacity of 22.5 cu. yd. heaped or 31 tons.

CAT* DW21 Tractor with Athey PR21 Rear Dump Trailer delivers high production for Newport Excavating Co., Nanticoke, Pa.

This is one of two DW21-PR21 units used by the Newport Excavating Co., in its own pit operation in Sheatown, Pa. This pit is down more than 100 feet. Shovel loaded, each DW21-PR21 handles a rated 22.5 cu. yd. of rock a load and hauls it 300 yards up a 7½% grade to the dump. Average cycle time per unit on the 600-yard round-trip haul: 6½ minutes. Both units work 24 hours a day, 5 days a week, 12 months a year.

Perfectly matched with the rugged PR21, the new Caterpillar DW21 (Series C) has a modern, heavy-duty Turbocharged diesel engine that develops 300 HP (maximum output)—power aplenty for fast cycle times even on adverse hauls. What's more, because of its 4-cycle design, the engine delivers *dependable* power day after day with a minimum of maintenance. No fuel system adjustments are required. There are no cylinder ports or air boxes to clean. And low-cost No. 2 furnace oil can be used without fouling. Among other factors that lessen maintenance and boost production: 90-degree, automotive "feel" steering for fast, accurate maneuvering around the shovel; hydraulic controlled dumping fast, clean and safe, and wide-section 29.5-29 tubeless tires for maximum traction in tough going. The tubeless tires also eliminate an estimated 80% of down time caused by old-fashioned tires!

For fast cycle times and steady production, you can't beat the DW21-PR21 in rock work. Your Caterpillar Dealer, who backs you with prompt service and parts you can trust, will gladly give you complete details of its performance. Call him today!

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

HEAVY-DUTY EQUIPMENT FOR THE HARD WORK

coal processors all over America prefer

WISSCO-LOY® SPACE SCREENS

If you haven't switched to Wissco-Loy Space Screens yet, you owe it to yourself—and your profit—to find out about them.

You'll find that Wissco-Loy Screens are tailor-made to your specific need, but are low in initial cost. And they give long service because every knuckle of the tough, special wire is carefully crimped to prevent "hidden wear" at the wire intersections.

Tailor-made . . . low in cost . . . long in service. Yet Wissco-Loy Space Screens give you even more. For Wickwire engineers are always available to help you solve your screening problems and to recommend the right screen for your job.

Get the complete story on all the advantages offered by Wissco-Loy Screens. Without obligation. Just contact your nearby CF&I representative today.

NEED STAINLESS STEEL SPACE CLOTH OR EXTRA-RUGGED SCREENS? Ask your CF&I representative about his complete line of stainless steel screens as well as extra-tough, oil-tempered Super-Tempered Precision Space Screens.

CF&I **SPACE SCREENS**

THE COLORADO FUEL AND IRON CORPORATION

THE COLORADO FUEL AND IRON CORPORATION—Albuquerque · Amarillo · Billings · Boise · Butte · Casper · Denver · El Paso · Ft. Worth · Houston · Lincoln (Neb.) · Los Angeles · Oakland · Oklahoma City · Phoenix · Portland · Pueblo · Salt Lake City · San Antonio · San Francisco · Seattle · Spokane · Wichita · WICKWIRE SPENCER STEEL DIVISION—Atlanta · Boston · Buffalo · Chicago · Detroit · New Orleans · New York · Philadelphia
CF&I OFFICES IN CANADA: Montreal · Toronto
CANADIAN REPRESENTATIVES AT: Calgary · Edmonton · Vancouver · Winnipeg

4333

350 TPH OF RUN-OF-MINE COAL is handled and processed at the recently completed Joanne Coal Company's plant at Rachel, W. Va. Facility reduces 24" maximum lumps to 5" x 0" uniform, 3.0% moisture content metallurgical and steam coal. Under a "turn-key" contract, Link-Belt supplied preparation plant, concrete blending bin, washery refuse bins, belt conveyors, coal thickener and refuse thickener.

How LINK-BELT designed, equipped and erected Joanne Plant under an

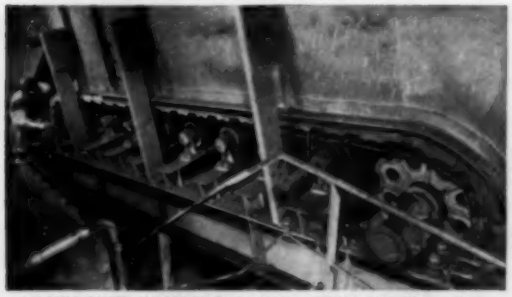
ALL-IN-ONE CONTRACT

AIR-PULSATED WASHER provides a clean coal free from refuse, bone, etc.—removes heavy refuse immediately . . . provides sharp separation of lighter refuse.

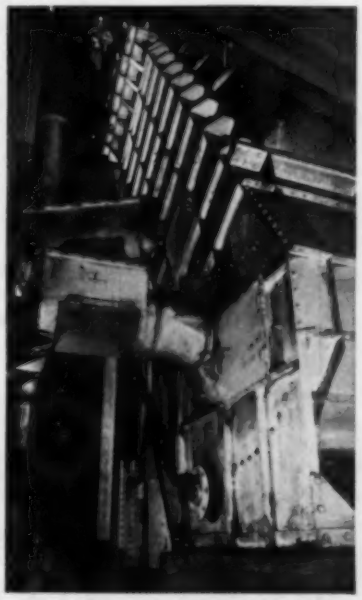
"Turn-key" service provides full facilities for producing metallurgical and steam coal

FROM foundation to finished 350-tph coal preparation facility—the Joanne plant is another example of Link-Belt single-contract service. Under this all-inclusive program, Link-Belt furnished materials handling and preparation equipment . . . followed through with erection and placed the plant in operation.

Call on Link-Belt to equip and build your new plant, or modernize your existing system. Our coal preparation experts will analyze your needs—recommend low-cost handling and processing best suited to your particular seam and market requirements. For complete engineering information and prompt service—without obligation—call your nearby Link-Belt office.



HEAVY-DUTY MANGANESE STEEL APRON FEEDER—36 in. wide—delivers 350 tph of run-of-mine coal from dump hopper to vibrating screen.



LINK-BELT MULTI-LOUVRE DRYER (one of two) provides thermal drying for ¼" x 0" centrifugally dried coal.

42-IN. FLIGHT CONVEYOR carries 5" x 0" raw coal to Link-Belt parallel bed air-pulsated washer on floor above.

LINK-BELT

14,303

COAL PREPARATION AND HANDLING EQUIPMENT

LINK-BELT COMPANY: Chicago 9, Birmingham 3, Cleveland 15, Denver 2, Detroit 4, Huntington 9, W. Va., Indianapolis 6, Kansas City 8, Mo., Louisville 2, Pittsburgh 13, Seattle 4, St. Louis 1, Scarboro (Toronto 13), Springs (South Africa).